7/5/25

LAB – 9

K-means Algorithm

For the given data, compute two clusters using k-means algorithm for clustering where initial cluster centres are (1.0, 1.0) & (5.0, 7.0). Execute for 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

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

Record	Point (A, B)	distance $C_1(1.0, 1.0)$	distance (5.0, 7.0)	
R1	(1.0, 1.0)	0.0	7.21	C_1
R2	(1.5, 2.0)	1.12	6.16	C_1
R3	(3.0, 4.0)	3.61	4.24	C_1
R4	(5.0, 7.0)	7.21	0.0	C_2
R5	(3.5, 5.0)	5.00	2.50	C_2
R6	(4.5, 5.0)	5.32	2.24	C_2
R7	(3.5, 4.5)	4.30	3.20	C_2

cluster c1 : R1, R2, R3

cluster c2 : R4, R5, R6, R7

c_1 (1.0, 1.0) , (1.5, 2.0) (3.0, 4.0)

$C_1 = \left(\frac{1.0+1.5+3.0}{3}, \frac{1.0+2.0+4.0}{3}\right) = (1.83, 2.33)$

Bafna Gold
Date: Page:

C_2 (5.0, 7.0), (3.5, 5.0), (4.5, 5.0), (3.5, 4.5)

$C_2 = \left(\frac{5.0+3.5+4.5+3.5}{4}, \frac{7.0+5.0+5.0+4.5}{4}\right)$

$= (4.125, 5.375)$

Record	Point (A, B)	distance (1.83, 2.33)	dist (4.125, 5.375)	dist
R1	(1.0, 1.0)	1.57	5.62	C_1
R2	(1.5, 2.0)	0.47	4.52	C_1
R3	(3.0, 4.0)	2.12	1.63	C_2
R4	(5.0, 7.0)	5.71	1.85	C_2
R5	(3.5, 5.0)	3.53	0.78	C_2
R6	(4.5, 5.0)	3.92	0.53	C_2
R7	(3.5, 4.5)	3.07	1.01	C_2

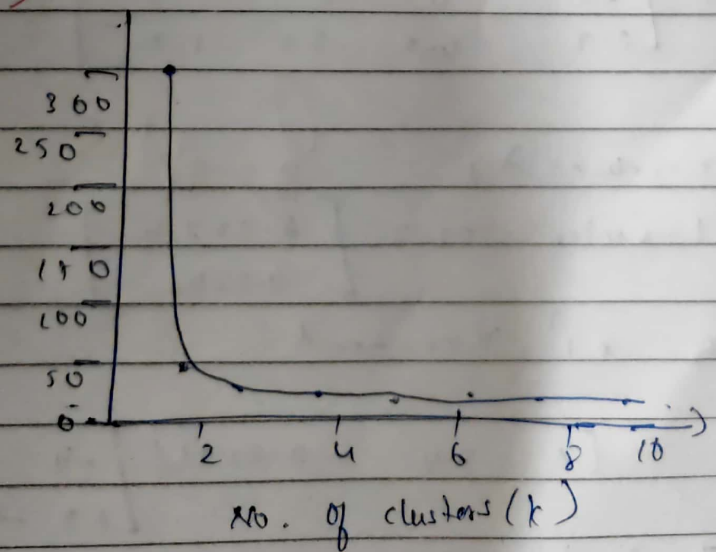
Cluster (1) = R1 (1.0, 1.0) R2 (1.5, 2.0)

cluster (2 = 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)

Elbow Method For optimal K



tance (5.0, 7.0) clu
7.21 C_1
6.10 C_1
.24 C_1
.0 C_2
50 C_2
4 C_2
20 C_2

(1.83, 2.33)