K- Mean Clustering

K - mean

Q. c_1 c_2

$(2,3)$ $(5,6)$, $(8,7)$, $(1,4)$, $(2,2)$, $(6,7)$, $(3,4)$, $(8,6)$

K = 2

→ $C_1 (2,3)$ → $C_2 (5,6)$

X	Y	$\sqrt{(x-2)^2+(y-3)^2}$	$\sqrt{(x-5)^2+(y-6)^2}$	
2	3	$\sqrt{(2-2)^2+(3-3)^2}=0$	$\sqrt{(2-5)^2+(3-6)^2}=\sqrt{18}$	C_1
5	6	$\sqrt{(5-2)^2+(6-3)^2}=\sqrt{18}$	$\sqrt{(5-5)^2+(6-6)^2}=0$	C_2
8	7	$\sqrt{(8-2)^2+(7-3)^2}=\sqrt{52}$	$\sqrt{(8-5)^2+(7-6)^2}=\sqrt{10}$	C_2
1	4	$\sqrt{2}$	$\sqrt{20}$	C_1
2	2	$\sqrt{2}$	$\sqrt{20}$	C_1
6	7	$\sqrt{32}$	5	C_1
3	4	$\sqrt{2}$	$\sqrt{2}$	C_1
8	6	$\sqrt{45}$	$\sqrt{8}$	C_2
			$\sqrt{9}$	C_1
				C_2

$C_1 = (2,3), (1,4), (2,2), (3,4)$ ⟹ Mean $(x,y) = \left(\dfrac{x_1+x_2+x_3+x_4}{4}\right), \dfrac{y_1+y_2+y_3+y_4}{4}$

$C_2 = (5,6), (8,7), (6,7), (8,4)$

Q. $(2,3)$ $(5,6)$, $(8,7)$, $(1,4)$, $(2,2)$, $(6,7)$, $(3,9)$, $(8,6)$

$K=2$

X	Y
2	3
5	6
8	7
1	4
2	2
6	7
3	4
8	6

C_2

mean, $= \dfrac{x_1 + x_2 + x_3 + x_4}{4}$, $\dfrac{y_1 + y_2 + y_3 + y_4}{4}$

$= \dfrac{2+1+2+3}{4}$, $\dfrac{3+4+2+4}{7}$

$C_1 = (2, 3.25)$

$C_2 = \dfrac{x_1 + x_2 + x_3 + x_4}{4}$, $\dfrac{y_1 + y_2 + y_3 + y_4}{4}$

$C_2 = (6.75, 6.5)$

$C_1 = (2, 3.25)$

$C_2 = (6.75, 6.5)$

K - Mean

Q. $(2,3)$ $(5,6)$, $(8,7)$, $(1,4)$, $(2,2)$, $(6,7)$, $(3,9)$, $(8,6)$

c_1 ↓ c_2 ↓

K = 2

$$c_1 = (2, 3.25) \qquad c_2 = (6.75, 6.5)$$

X	Y	$\sqrt{(x-2)^2 + (y-3.25)^2}$	$\sqrt{(x-6.75)^2 + (y-6.5)^2}$	
2	3	0.25	$\sqrt{34.81}$	c_1
5	6	$\sqrt{16.56}$	$\sqrt{3.31}$	c_2
8	7	$\sqrt{50.06}$	$\sqrt{1.81}$	c_2
1	4	$\sqrt{1.56}$	$\sqrt{39.31}$	c_1
2	2	$\sqrt{1.25}$	$\sqrt{42.81}$	c_1
6	7	$\sqrt{30.06}$	$\sqrt{0.8\,}$	c_1
3	9	$\sqrt{1.56}$	$\sqrt{20.37}$	c_2
8	6	$\sqrt{43.56}$	$\sqrt{1.81}$	c_1

Σ

$c_1 = (2, 3.25)$ $(2, 3.25)$

$c_2 = (6.75, 6.5)$ $(6.75, 6.5)$

c_1 c_2

Q.   (2, 3)   (5, 6), (8, 7), (1, 4), (2, 2), (6, 7), (3, 4), (8, 6)

K = 2

X	Y
2	3
5	6
8	7
1	4
2	2
6	7
3	4
8	6

c_2

c_1

$c_1 = (2, 3.25)$

$c_2 = (6.75, 6.5)$