

# K-means cluster:

# K

$$K = \{2, 3, 4, 10, 11, 12, 20, 25, 30\}$$

$$\therefore K = 2$$

# Solve

∴ The given data is -

$$K = \{2, 3, 4, 10, 11, 12, 20, 25, 30\}$$

∴ Let  $K = 2$ , where two cluster is going to find.

∴ Iteration-1

Let mean  $m_1, m_2$

$$\therefore m_1 = 4$$

$$m_2 = 12$$

Note -

$$m_2 = 12$$

$$(K - m_1) = u_1$$

$$(K - m_2) = u_2$$

∴ min value will be taken

$$\therefore K_1 = \{2, 3, 4\}$$

$$K_2 = \{10, 11, 12, 20, 25, 30\}$$

$$\therefore m_1 = \frac{2+3+4}{3}$$

$$m_2 = \frac{10+11+12+20+25+30}{6}$$

$$\Rightarrow m_1 = \frac{9}{3}$$

$$\Rightarrow m_2 = \frac{108}{6}$$

$$\Rightarrow m_1 = 3$$

$$\Rightarrow m_2 = 18$$

# Iteration-2:

∴ STEP-1

∴ Now

$$K_1 = \{2, 3, 4, 10, 11, 12\}$$

$$K_2 = \{20, 25, 30\}$$

$$\therefore m_1 = 2 \quad 2 \times 10 =$$

$$m_1 = \frac{19}{4}$$

$$m_1 = 4.75$$

$$\Rightarrow m_2 = 5$$

$$m_2 = \frac{18}{5}$$

$$\Rightarrow m_2 = 19.5$$

$$\Rightarrow m_2 = 20$$

steps 2:

Iteration-3:

$$K_1 = \{2, 3, 4, 10, 11, 12\}$$

$$K_2 = \{20, 25, 30\}$$

$$\therefore m_1 = \frac{42}{6}$$

$$m_2 = \frac{75}{3}$$

$$\Rightarrow m_1 = 7$$

$$\Rightarrow m_2 = 25$$

steps 2:

Iteration-4:

$$K_1 = \{2, 3, 4, 10, 11, 12\}$$

$$K_2 = \{20, 25, 30\}$$

$$\therefore m_1 = \frac{42}{6}$$

$$m_2 = \frac{75}{3}$$

$$\Rightarrow m_1 = 7$$

$$\Rightarrow m_2 = 25$$

∴ Thus we are getting same mean  
here we need to stop.

∴ The new cluster is -

$$K_1 = \{ 2, 3, 4, 10, 11, 12 \}$$

$$K_2 = \{ 20, 25, 30 \}$$

and centroid is  $[7, 25]$