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Tugas Minggu Ke – 10 Data Mining

1. **Tentukan anggota klasternya jika dikelompokan menjadi 2 klaster ?**
   a. M1 = (1, 4.5),
   b. M2 = (3, 6.5),
   c. M3 = (4, 4.5),
   d. M4 = (7.5, 3.2),
   e. M5 = (6, 2.3),
   f. M6 = (2.5, 3.8),
   g. M7 = (5, 5.5)
2. **Titik Pusat Cluster**
   a. C_1(3,4)
   b. C_2(6,4)

Jawab :

1. **Iterasi 1**
   a. **Menghitung Euclidean Distance dari semua data ke tiap titik pusat**
      - D11 = $\sqrt{(M1x - C1x)^2 + (M1y - C1y)^2}$
        = $\sqrt{(1-3)^2 + (4.5-4)^2}$ = $\sqrt{4.25}$ = 2.061
      - D12 = $\sqrt{(M2x - C1x)^2 + (M2y - C1y)^2}$
        = $\sqrt{(3-3)^2 + (6.5-4)^2}$ = $\sqrt{6.25}$ = 2.500
      - D13 = $\sqrt{(M3x - C1x)^2 + (M3y - C1y)^2}$
        = $\sqrt{(4-3)^2 + (4.5-4)^2}$ = $\sqrt{1.25}$ = 1,118
      - D14 = $\sqrt{(M4x - C1x)^2 + (M4y - C1y)^2}$
        = $\sqrt{(7.5-3)^2 + (3.2-4)^2}$ = $\sqrt{20.89}$ = 4.570
      - D15 = $\sqrt{(M5x - C1x)^2 + (M5y - C1y)^2}$
        = $\sqrt{(6-3)^2 + (2.3-4)^2}$ = $\sqrt{11.89}$ = 3.448
      - D16 = $\sqrt{(M6x - C1x)^2 + (M6y - C1y)^2}$
        = $\sqrt{(2.5-3)^2 + (3.8-4)^2}$ = $\sqrt{0.29}$ = 0.538
      - D17 = $\sqrt{(M7x - C1x)^2 + (M7y - C1y)^2}$
        = $\sqrt{(5-3)^2 + (5.5-4)^2}$ = $\sqrt{6.25}$ = 2.500
      - D21 = $\sqrt{(M1x - C2x)^2 + (M1y - C2y)^2}$
        = $\sqrt{(1-6)^2 + (4.5-4)^2}$ = $\sqrt{25.25}$ = 5.024
      - D22 = $\sqrt{(M2x - C2x)^2 + (M2y - C2y)^2}$
        = $\sqrt{(3-6)^2 + (6.5-4)^2}$ = $\sqrt{15.25}$ = 3.905

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- D23 = $\sqrt{(M3x - C2x)^2 + (M3y - C2y)^2}$

  = $\sqrt{(4-6)^2 + (4.5-4)^2}$ = $\sqrt{4.25}$ = 2.061

- D24 = $\sqrt{(M4x - C2x)^2 + (M4y - C2y)^2}$

  = $\sqrt{(7.5-6)^2 + (3.2-4)^2}$ = $\sqrt{2.89}$ = 1.700

- D25 = $\sqrt{(M5x - C2x)^2 + (M5y - C2y)^2}$

  = $\sqrt{(6-6)^2 + (2.3-4)^2}$ = $\sqrt{2.89}$ = 1.700

- D26 = $\sqrt{(M6x - C2x)^2 + (M6y - C2y)^2}$

  = $\sqrt{(2.5-6)^2 + (3.8-4)^2}$ = $\sqrt{12.29}$ = 3.505

- D27 = $\sqrt{(M7x - C2x)^2 + (M7y - C2y)^2}$

  = $\sqrt{(5-6)^2 + (5.5-4)^2}$ = $\sqrt{3.25}$ = 1.802

b. Dari perhitungan Euclidean Distance, kita bisa membandingkan:

Jarak	M1	M2	M3	M4	M5	M6	M7
Ke C1	**2.061**	**2.500**	**1,118**	4.570	3.448	**0.538**	2.500
Ke C2	5.024	3.905	2.061	**1.700**	**1.700**	3.505	**1.802**

= {M1, M2, M3, M6} anggota C1 dan {M4, M5, M7} anggota C2.

c. Menghitung titik pusat baru

M1 = (1, 4.5), M2 = (3, 6.5), M3 = (4, 4.5), M4 = (7.5, 3.2), M5 = (6, 2.3), M6 = (2.5, 3.8), M7 = (5, 5.5)

C1 = $\left(\frac{1+3+4+2.5}{4}, \frac{4.5+6.5+4.5+3.8}{4}\right)$ = (2.625, 4.825)

C2 = $\left(\frac{7.5+6+5}{3}, \frac{3.2+2.3+5.5}{3}\right)$ = (6.167, 3.667)

2. Iterasi 2

a. Menghitung Euclidean Distance dari semua data ke tiap titik pusat

- D11 = $\sqrt{(M1x - C1x)^2 + (M1y - C1y)^2}$

  = $\sqrt{(1-2.625)^2 + (4.5-4.825)^2}$ = $\sqrt{2.74625}$ = 1.657

- D12 = $\sqrt{(M2x - C1x)^2 + (M2y - C1y)^2}$

  = $\sqrt{(3-2.625)^2 + (6.5-4.825)^2}$ = $\sqrt{2.94625}$ = 1.716

- D13 = $\sqrt{(M3x - C1x)^2 + (M3y - C1y)^2}$

  = $\sqrt{(4-2.625)^2 + (4.5-4.825)^2}$ = $\sqrt{1.99625}$ = 1.412

- D14 = $\sqrt{(M4x - C1x)^2 + (M4y - C1y)^2}$

$= \sqrt{(7.5 - 2.625)^2 + (3.2 - 4.825)^2} = \sqrt{26.40625} = 5.138$

- D15 = $\sqrt{(M5x - C1x)^2 + (M5y - C1y)^2}$

  $= \sqrt{(6 - 2.625)^2 + (2.3 - 4.825)^2} = \sqrt{27.76625} = 5.269$

- D16 = $\sqrt{(M6x - C1x)^2 + (M6y - C1y)^2}$

  $= \sqrt{(2.5 - 2.625)^2 + (3.8 - 4.825)^2} = \sqrt{1.06625} = 1.032$

- D17 = $\sqrt{(M7x - C1x)^2 + (M7y - C1y)^2}$

  $= \sqrt{(5 - 2.625)^2 + (5.5 - 4.825)^2} = \sqrt{6.09625} = 2.469$

- D21 = $\sqrt{(M1x - C2x)^2 + (M1y - C2y)^2}$

  $= \sqrt{(1 - 6.167)^2 + (4.5 - 3.667)^2} = \sqrt{27.391778} = 5.233$

- D22 = $\sqrt{(M2x - C2x)^2 + (M2y - C2y)^2}$

  $= \sqrt{(3 - 6.167)^2 + (6.5 - 3.667)^2} = \sqrt{18.055778} = 4.249$

- D23 = $\sqrt{(M3x - C2x)^2 + (M3y - C2y)^2}$

  $= \sqrt{(4 - 6.167)^2 + (4.5 - 3.667)^2} = \sqrt{5.389778} = 2.321$

- D24 = $\sqrt{(M4x - C2x)^2 + (M4y - C2y)^2}$

  $= \sqrt{(7.5 - 6.167)^2 + (3.2 - 3.667)^2} = \sqrt{1.994978} = 1.412$

- D25 = $\sqrt{(M5x - C2x)^2 + (M5y - C2y)^2}$

  $= \sqrt{(6 - 6.167)^2 + (2.3 - 3.667)^2} = \sqrt{1.896578} = 1.377$

- D26 = $\sqrt{(M6x - C2x)^2 + (M6y - C2y)^2}$

  $= \sqrt{(2.5 - 6.167)^2 + (3.8 - 3.667)^2} = \sqrt{13{,}464578} = 3.669$

- D27 = $\sqrt{(M7x - C2x)^2 + (M7y - C2y)^2}$

  $= \sqrt{(5 - 6.167)^2 + (5.5 - 3.667)^2} = \sqrt{4.721778} = 2.172$

b. Dari perhitungan Euclidean Distance, kita bisa membandingkan:

Jarak	M1	M2	M3	M4	M5	M6	M7
Ke C1	**1.657**	**1.716**	**1.412**	5.138	5.269	**1.032**	2.469
Ke C2	5.233	4.249	2.321	**1.412**	**1.337**	3.669	**2.172**

= {M1, M2, M3, M6} anggota C1 dan {M4, M5, M7} anggota C2.

c. Karena anggota kelompok tidak ada yang berubah maka titik pusat pun tidak akan berubah.

3. Kesimpulan : {M1, M2, M3, M6} anggota C1 dan {M4, M5, M7} anggota C2.