

Latihan Soal (Kuis) 41 MATA KULIAH DATA MINING PROGRAM STUDI TEKNIK INFORMATIKA – S1

- Tentukan anggota klasternya, jika dikelompokkan menjadi 2 klaster?

$$M1 = (1, 4.5),$$

$$M2 = (3, 6.5),$$

$$M3 = (4, 4.5),$$

$$M4 = (7.5, 3.2),$$

$$M5 = (6, 2.3),$$

$$M6 = (2.5, 3.8),$$

$$M7 = (5, 5.5)$$

- Titik Pusat Cluster => C1(3,4), C2(6,4)

- Menghitung Euclidean distance dari semua data ke tiap titik pusat pertama

$$D_{11} = \sqrt{(M_{1x} - C_{1x})^2 + (M_{1y} - C_{1y})^2} = (1 - 3)^2 + (4.5 - 4)^2 = \sqrt{4 + 0.25} = 4.25 = 2.06155$$

$$D_{12} = \sqrt{(M_{2x} - C_{1x})^2 + (M_{2y} - C_{1y})^2} = (3 - 3)^2 + (6.5 - 4)^2 = \sqrt{0 + 6.25} = 6.25 = 2.5$$

$$D_{13} = \sqrt{(M_{3x} - C_{1x})^2 + (M_{3y} - C_{1y})^2} = (4 - 3)^2 + (4.5 - 4)^2 = \sqrt{1 + 0.25} = 1.25 = 1.11803$$

$$D_{14} = \sqrt{(M_{4x} - C_{1x})^2 + (M_{4y} - C_{1y})^2} = (7.5 - 3)^2 + (3.2 - 4)^2 = \sqrt{20.25 + 0.64} = 19.61 = 4.42832$$

$$D_{15} = \sqrt{(M_{5x} - C_{1x})^2 + (M_{5y} - C_{1y})^2} = (6 - 3)^2 + (2.3 - 4)^2 = \sqrt{9 + 2.89} = 11.89 = 3.44819$$

$$D_{16} = \sqrt{(M_{6x} - C_{1x})^2 + (M_{6y} - C_{1y})^2} = (2.5 - 3)^2 + (3.8 - 4)^2 = \sqrt{0.25 + 0.04} = 0.29 = 0.538516$$

$$D_{17} = \sqrt{(M_{7x} - C_{1x})^2 + (M_{7y} - C_{1y})^2} = (5 - 3)^2 + (5.5 - 4)^2 = \sqrt{4 + 2.25} = 6.25 = 2.5$$

- Menghitung Euclidean distance dari semua data ke tiap titik pusat kedua

$$D_{21} = \sqrt{(M_{1x} - C_{2x})^2 + (M_{1y} - C_{2y})^2} = (1 - 6)^2 + (4.5 - 4)^2 = \sqrt{25 + 0.25} = 25.25 = 5.02494$$

$$D_{22} = \sqrt{(M_{2x} - C_{2x})^2 + (M_{2y} - C_{2y})^2} = (3 - 6)^2 + (6.5 - 4)^2 = \sqrt{9 + 6.25} = 15.25 = 3.90512$$

$$D_{23} = \sqrt{(M_{3x} - C_{2x})^2 + (M_{3y} - C_{2y})^2} = (4 - 6)^2 + (4.5 - 4)^2 = \sqrt{4 + 0.25} = 4.25 = 2.06155$$

$$D_{24} = \sqrt{(M_{4x} - C_{2x})^2 + (M_{4y} - C_{2y})^2} = (7.5 - 6)^2 + (3.2 - 4)^2 = \sqrt{2.25 + 0.64} = 2.89 = 1.7$$

$$D_{25} = \sqrt{(M_{5x} - C_{2x})^2 + (M_{5y} - C_{2y})^2} = (6 - 6)^2 + (2.3 - 4)^2 = \sqrt{0 + 2.89} = 2.89 = 1.7$$

$$D_{26} = \sqrt{(M_{6x} - C_{2x})^2 + (M_{6y} - C_{2y})^2} = (2.5 - 6)^2 + (3.8 - 4)^2 = \sqrt{12.25 + 0.04} = 12.29 = 3.50571$$

$$D_{27} = \sqrt{(M_{7x} - C_{2x})^2 + (M_{7y} - C_{2y})^2} = (5 - 6)^2 + (5.5 - 4)^2 = \sqrt{1 + 2.25} = 3.25 = 1.80278$$

B. Dari penghitungan Euclidean distance, kita dapat membandingkan:

	M1	M2	M3	M4	M5	M6	M7
C1	2.06155	2.5	1.11803	4.42832	3.44819	0.538516	2.5
C2	5.02494	3.90512	2.06155	1.7	1.7	3.50571	1.80278

Anggota C1={M1,M2,M3,M6}

Anggota C2={M4,M5,M7}

C. Hitung 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)

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

$$C2 = \left(\frac{7.5 + 6 + 5}{3}, \frac{3.2 + 2.3 + 5.5}{3} \right) = (6.16, 3.6)$$

a. Menghitung Euclidean distance dari semua data ke tiap titik pusat baru pertama

$$D_{11} = \sqrt{(M_{1x} - C_{1x})^2 + (M_{1y} - C_{1y})^2} = (1 - 2.625)^2 + (4.5 - 4.825)^2 = \sqrt{2.640625 + 0.105625} = 1.28732$$

$$D_{12} = \sqrt{(M_{2x} - C_{1x})^2 + (M_{2y} - C_{1y})^2} = (3 - 2.625)^2 + (6.5 - 4.825)^2 = \sqrt{0.140625 + 2.805625} = 1.71646$$

$$D_{13} = \sqrt{(M_{3x} - C_{1x})^2 + (M_{3y} - C_{1y})^2} = (4 - 2.625)^2 + (4.5 - 4.825)^2 = \sqrt{1.890625 + 0.105625} = 1.41289$$

$$D_{14} = \sqrt{(M_{4x} - C_{1x})^2 + (M_{4y} - C_{1y})^2} = (7.5 - 2.625)^2 + (3.2 - 4.825)^2 = \sqrt{23.765625 + 2.640625} = 5.1387$$

$$D_{15} = \sqrt{(M_{5x} - C_{1x})^2 + (M_{5y} - C_{1y})^2} = (6 - 2.625)^2 + (2.3 - 4.825)^2 = \sqrt{11.390625 + 6.375625} = 4.215$$

$$D_{16} = \sqrt{(M_{6x} - C_{1x})^2 + (M_{6y} - C_{1y})^2} = (2.5 - 2.625)^2 + (3.8 - 4.825)^2 = \sqrt{0.015625 + 1.050625} = 1.03259$$

$$D_{17} = \sqrt{(M_{7x} - C_{1x})^2 + (M_{7y} - C_{1y})^2} = (5 - 2.625)^2 + (5.5 - 4.825)^2 = \sqrt{5.640625 + 0.455625} = 2.4702$$

b. Menghitung Euclidean distance dari semua data ke tiap titik pusat baru kedua

$$D_{21} = \sqrt{(M_{1x} - C_{2x})^2 + (M_{1y} - C_{2y})^2} = (1 - 6.16)^2 + (4.5 - 3.6)^2 = \sqrt{26.6256 + 0.81} = 5.2379$$

$$D_{22} = \sqrt{(M_{2x} - C_{2x})^2 + (M_{2y} - C_{2y})^2} = (3 - 6.16)^2 + (6.5 - 3.6)^2 = \sqrt{9.9856 + 8.41} = 4.28901$$

$$D_{23} = \sqrt{(M_{3x} - C_{2x})^2 + (M_{3y} - C_{2y})^2} = (4 - 6.16)^2 + (4.5 - 3.6)^2 = \sqrt{4.6656 + 0.81} = 2.3464$$

$$D_{24} = \sqrt{(M_{4x} - C_{2x})^2 + (M_{4y} - C_{2y})^2} = (7.5 - 6.16)^2 + (3.2 - 3.6)^2 = \sqrt{1.7956 + 0.16} = 1.39843$$

$$D_{25} = \sqrt{(M_{5x} - C_{2x})^2 + (M_{5y} - C_{2y})^2} = (6 - 6.16)^2 + (2.3 - 3.6)^2 = \sqrt{0.0256 + 1.69} = 1.30981$$

$$D_{26} = \sqrt{(M_{6x} - C_{2x})^2 + (M_{6y} - C_{2y})^2} = (2.5 - 6.16)^2 + (3.8 - 3.6)^2 = \sqrt{13.3956 + 0.04} = 3.66546$$

$$D_{27} = \sqrt{(M_{7x} - C_{2x})^2 + (M_{7y} - C_{2y})^2} = (5 - 6.16)^2 + (5.5 - 3.6)^2 = \sqrt{1.3456 + 3.61} = 2.22612$$

	M1	M2	M3	M4	M5	M6	M7
C1	1.28732	1.71646	1.41289	5.1387	4.215	1.03259	2.4702
C2	5.2379	4.28901	2.3464	1.39843	1.30981	3.66546	2.22612

Anggota C1={M1,M2,M3,M6}

Anggota C2={M4,M5,M7}

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

Kesimpulan

Anggota C1={M1,M2,M3,M6}

Anggota C2={M4,M5,M7}