Yohanes Dimas Pratama

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Tugas Pertemuan 10

~ Clustering dengan K-Means ~

	X	Y
M1	1	4.5
M2	3	6.5
M3	4	4.5
M4	7	3.2
M5	6	2.3
M6	2	3.8
M7	5	5.5
C1	3	4
C2	6	4

Iterasi 1

1. Menghitung Euclidian Distance dari setiap data ke setiap titik pusat menggunakan rumus:

$$d_{ij} = \sqrt{\sum_{k=1}^{n} (x_{ik} - x_{jk})^2}$$

- Titik pusat 1

  $D_{11} = \sqrt{(M_{1X} - C_{1X})^2 + (M_{1Y} - C_{1Y})^2} = \sqrt{(1-3)^2 + (4.5-4)^2}$ = 2.062

  D_{12} = 2.5

  D_{13} = 1.118

  D_{14} = 4.079

  D_{15} = 3.448

  D_{16} = 1.019

  D_{17} = 2.5

- Titik pusat 2

  $D_{21} = \sqrt{(M_{1X} - C_{2X})^2 + (M_{1Y} - C_{2Y})^2} = \sqrt{(1-6)^2 + (4.5-4)^2}$ = 5.025

  D_{22} = 3.905

  D_{23} = 2.062

  D_{24} = 1.281

  D_{25} = 1.7

  D_{26} = 4.005

  D_{27} = 1.803

2. Mencari anggota C1 dan C2

	M1	M2	M3	M4	M5	M6	M7
C1	2.062	2.5	1.118	4.079	3.448	1.019	2.5
C2	5.025	3.905	2.062	1.281	1.7	4.005	1.803

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

3. Menghitung titik pusat baru
* $\frac{1+3+4+2}{4} = 2.5$
* $\frac{4.5+6.5+4.5+3.8}{4} = 4.825$

C1 = 2.5 dan 4.825

* $\frac{7+6+5}{3} = 6$
* $\frac{3.2+2.3+5.5}{3} = 3.667$

C2 = 6 dan 3.667

Iterasi 2

1. Menghitung Euclidian Distance dari setiap data ke setiap titik pusat baru menggunakan rumus:

$$d_{ij} = \sqrt{\sum_{k=1}^{n} (x_{ik} - x_{jk})^2}$$

- Titik pusat baru 1

  $D_{11} = \sqrt{(M_{1X} - C_{1X})^2 + (M_{1Y} - C_{1Y})^2} = \sqrt{(1 - 2.5)^2 + (4.5 - 3.667)^2}$ = 1.534
  D_{12} = 1.748
  D_{13} = 1.534
  D_{14} = 4.784
  D_{15} = 4.315
  D_{16} = 1.14
  D_{17} = 2.589

- Titik pusat baru 2

  $D_{11} = \sqrt{(M_{1X} - C_{2X})^2 + (M_{1Y} - C_{2Y})^2} = \sqrt{(1 - 2.5)^2 + (4.5 - 3.667)^2}$ = 5.068
  D_{12} = 4.126
  D_{13} = 2.166
  D_{14} = 1.103
  D_{15} = 1.367
  D_{16} = 4.002
  D_{17} = 2.088

2. Mencari anggota C1 dan C2

	M1	M2	M3	M4	M5	M6	M7
C1	1.534	1.748	1.534	4.784	4.315	1.14	2.589
C2	5.068	4.126	2.166	1.103	1.367	4.002	2.088

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

3. Dapat disimpulkan titik pusat tidak akan berubah karena anggota kelompok masih sama.