1. Please use k-means to divide 1, 5, 7, 8, 12, and 20 into two clusters. Assume that 1 and 5 are the initial centroids.

Ans:

* + 1. 靠近1的: {1}, 靠近5的: {5,7,8,12,20}
    2. 重心修正: {1}還是1, {5,7,8,12,20}平均後10.4
    3. 分類後: {1,5}, {7,8,12,20}
    4. 再改重心: {1,5}是3, {7,8,12,20}是11.75
    5. {1,5,7}, {8,12,20}
    6. 重心: 4.3, 13.3
    7. {1,5,7,8}, {12,20}
    8. 重心: 5.25, 16
    9. 因為重新分類後還是{1,5,7,8}, {12,20}
* {1,5,7,8}, {12,20}

1. Using the following similarity measurement methods, calculate the distance between Person A and Person B:
   1. Euclidean distance
   2. Manhattan distance
   3. Weighted distance measurement method (weights: age 0.7, height 0.5, weight 0.3, score 0.1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Age** | **Height** | **Weight** | **Score** |
| Person A | 18 | 179 | 58 | 80 |
| Person B | 24 | 180 | 60 | 60 |

Ans:

1. 歐幾里德距離(Euclidean distance):

(18-24)2+(179-180)2+(58-60)2+(80-60)2 =

= = 21

1. 曼哈頓距離(Manhattan distance):

|18-24|+|179-180|+|58-60|+|80-60| = 6+1+2+20 = 29

1. 加權式距離衡量方式(Weighted distance measurement method):

0.7\*(18-24)2+0.5\*(179-180)2+0.3\*(58-60)2+0.1\*(80-60)2

= = = 8.1792

-------------------------------程式實作----------------------------------





















