**K means Assignment**

Manhattan ∑(x-y) Euclidean – (∑(x-y)2)½

**ITERATION NO: 01**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Age | M1 | M2 | M3 |  | | |  |  |
| C1(seed) | 18 | 73 | 75 | 57 | Distance from Clusters  Manhattan/ Euclidean | | | Cluster Allocated (manh) | Cluster Allocated (Euclidean) |
| C2(seed) | 18 | 79 | 85 | 75 | From C1 | From C2 | From C3 |
| C3(seed) | 23 | 70 | 70 | 52 |
| S1 | 18 | 73 | 75 | 57 | MANH = 0+0+0+0=0  EUCLIDEAN =  0+0+0+0=0 | MANH=0+6+10+18=34  EUCLIDEAN=21.44 | MANH=5+3+5+5  =18  EUCLIDEAN=9.16 | C1 | C1 |
| S2 | 18 | 79 | 85 | 75 | MANH = 0+6+10+18=34  EUCLIDEAN =  0+36+100+324 = sqrt(460)  = 21.44 | MANH = 0+0+0+0=0  EUCLIDEAN =  0+0+0+0=0 | MANH = 5+9+15+23=52  EUCLIDEAN = 25 + 81 +225 +529 = 860  =29.32 | C2 | C2 |
| S3 | 23 | 70 | 70 | 52 | MANH = 5+3+5+5=18  EUCLIDEAN =  25+9+25+25 = sqrt(84)  =9.16 | MANH =  5+9+15+23=52  EUCLIDEAN =  25+81+225+529=sqrt(860)  =29.32 | MANH = 0+0+0+0=0  EUCLIDEAN =  0+0+0+0=0 | C3 | C3 |
| S4 | 20 | 55 | 55 | 55 | MANH = 2+18+20+2=42  EUCLIDEAN =  4+324+400+4 = sqrt(732)  =27.055 | MANH =  2+24+30+20=76  EUCLIDEAN =  4+576+900+400=sqrt(1880)  =43.35 | MANH = 3+15+15+3=36  EUCLIDEAN =  9+225+225+9=sqrt(468)  =21.63 | C3 | C3 |
| S5 | 22 | 85 | 86 | 87 | MANH = 4+12+11+30=57  EUCLIDEAN =  16+144+121+900 = sqrt(1181)  =34.36 | MANH=  4+6+1+12=23  EUCLIDEAN =  16+36+1+144  =sqrt(197)  =14.035 | MANH=  1+15+16+35=67  EUCLIDEAN =  1+225+256+1225  =sqrt(1707)  =41.31 | C2 | C2 |
| S6 | 19 | 91 | 90 | 89 | MANH=  1+18+15+32=66  EUCLIDEAN=  1+324+225+1024  =sqrt(1524)  =39.03 | MANH=  1+12+5+14=32  EUCLIDEAN=  1+144+25+196  =sqrt(366)  =19.13 | MANH=  4+21+20+37=82  EUCLIDEAN=  16+441+400+1369  =sqrt(2226)  =47.18 | C2 | C2 |
| S7 | 20 | 70 | 65 | 60 | MANH=  2+3+10+3=18  EUCLIDEAN=  4+9+100+9  =sqrt(122)  =11.04 | MANH=  2+9+20+15=46  EUCLIDEAN=  4+81+400+225  =sqrt(710)  =26.64 | MANH=  3+0+5+8=16  EUCLIDEAN=  9+0+25+64  =sqrt(98)  =9.89 | C3 | C3 |
| S8 | 21 | 53 | 56 | 59 | MANH=  3+20+19+2=44  EUCLIDEAN=  9+400+361+4  =sqrt(774)  =27.82 | MANH=  3+26+28+16=73  EUCLIDEAN=  9+676+784+256  =sqrt(1725)  =41.53 | MANH=  2+17+14+7=40  EUCLIDEAN=  4+289+196+49  =sqrt(538)  =23.19 | C3 | C3 |
| S9 | 19 | 82 | 82 | 60 | MANH=  1+9+7+3=20  EUCLIDEAN=  1+81+49+9  =sqrt(140)  =11.83 | MANH=  1+3+3+15=22  EUCLIDEAN=  1+9+9+225  =sqrt(244)  =15.62 | MANH=  4+12+12+8=36  EUCLIDEAN=  16+144+144+64  =sqrt(368)  =19.18 | C1 | C1 |
| S10 | 47 | 75 | 76 | 77 | MANH=  29+2+1+20=52  EUCLIDEAN=  841+4+1+400  =sqrt(1246)  =35.29 | MANH=  29+4+1+2=44  EUCLIDEAN=  841+16+1+4  =sqrt(862)  =30.69 | MANH=  24+5+6+25=60  EUCLIDEAN=  576+25+36+476  =sqrt(1113)  =35.52 | C2 | C2 |
|  |  |  |  |  |  |  |  |  |  |

**C1: S1 (18,73,75,57) , MEAN: 18.5, 77.5, 78.5,58.5**

**S9(19,82,82,60)**

**C2: S2(18,79,85,75), MEAN: 26.5, 82.5, 84.25, 82**

**S5 (22,85,86,87),**

**S6(19,91,90,89),**

**S10(47,75,76,77)**

**C3: S3(23,70,70,52), MEAN: 21,62,61.5,56.5**

**S4(20,55,55,55),**

**S7(20,70,65,60),**

**S8(21,53,56,59)**

**ITERATION : 02**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Age | M1 | M2 | M3 |  | | |  |  |
| C1(seed) | 18.5 | 77.5 | 78.5 | 58.5 | Distance from Clusters  Manhattan/ Euclidean | | | Cluster Allocated (manh) | Cluster Allocated (Euclidean) |
| C2(seed) | 26.5 | 82.5 | 84.25 | 82 | From C1 | From C2 | From C3 |
| C3(seed) | 21 | 62 | 61.5 | 56.5 |
| S1 | 18 | 73 | 75 | 57 | MANH = 0.5+4.5+3.5+1.5=10  EUCLIDEAN =  0.25+20.25+12.25+2.2  =sqrt(45)  =6.70 | MANH =  8.5+9.5+9.5+25  =29.5  EUCLIDEAN =  72.25+90.25+90.25+625  =sqrt(877.75)  =29.62 | MANH =  3+11+13.5+0.5  =28  EUCLIDEAN=  9+121+182.25+0.25  =sqrt(312.5)  =17.67 | C1 | C1 |
| S2 | 18 | 79 | 85 | 75 | MANH =  0.5+1.5+6.5+16.5=25  EUCLIDEAN =  0.25+2.25+42.25+272.25 = sqrt(317)  = 17.80 | MANH =  8.5+3.5+0.75+7  =19.75  EUCLIDEAN =  72.25+12.25+0.5625+49  =sqrt(134.0625)  =11.57 | MANH = 3+17+23.5+18.5  =62  EUCLIDEAN =  9 + 289 +552.25 +342.25  = sqrt(1192.5)  =34.53 | C2 | C2 |
| S3 | 23 | 70 | 70 | 52 | MANH = 27  EUCLIDEAN = 32.75 | MANH = 90.25  EUCLIDEAN =  48.81 | MANH = 23  EUCLIDEAN =  12.66 | C3 | C3 |
| S4 | 20 | 55 | 55 | 55 | MANH = 51  EUCLIDEAN = 13.82 | MANH = 60.25  EUCLIDEAN =  35.65 | MANH = 16  EUCLIDEAN =  9.72 | C3 | C3 |
| S5 | 22 | 85 | 86 | 87 | MANH = 47  EUCLIDEAN = 30.61 | MANH = 13.75  EUCLIDEAN =  7.38 | MANH = 79  EUCLIDEAN =  45.39 | C2 | C2 |
| S6 | 19 | 91 | 90 | 89 | MANH = 56  EUCLIDEAN = 35.28 | MANH = 28.75  EUCLIDEAN =  14.51 | MANH = 92  EUCLIDEAN =  52.09 | C2 | C2 |
| S7 | 20 | 70 | 65 | 60 | MANH = 24  EUCLIDEAN = 15.58 | MANH = 60.25  EUCLIDEAN =  32.45 | MANH = 16  EUCLIDEAN =  9.46 | C3 | C3 |
| S8 | 21 | 53 | 56 | 59 | MANH = 50  EUCLIDEAN = 33.36 | MANH = 86.25  EUCLIDEAN =  47.19 | MANH = 17  EUCLIDEAN =  10.83 | C3 | C3 |
| S9 | 19 | 82 | 82 | 60 | MANH = 10  EUCLIDEAN = 5.91 | MANH = 32.25  EUCLIDEAN =  23.35 | MANH = 46  EUCLIDEAN =  28.92 | C1 | C1 |
| S10 | 47 | 75 | 76 | 77 | MANH = 52  EUCLIDEAN = 34.16 | MANH = 41.25  EUCLIDEAN =  23.86 | MANH = 74  EUCLIDEAN =  38.41 | C2 | C2 |
|  |  |  |  |  |  |  |  |  |  |

**Both iteration 1 & 2 are same. We conclude that required cluster are:**

|  |  |
| --- | --- |
| **C1** | **S1, S9** |
| **C2** | **S2, S5, S6, S10** |
| **C3** | **S3, S4, S7, S8** |