Robotic Vision: Homework 4

Distance formula:

Question #1)

Table

Description automatically generated

Question #2) Picture showing work is on the next page…   
Legend: Red – Blake, Orange – Grace, Green – Peter, Blue – Lebron

Table

Description automatically generated

Text, letter

Description automatically generated

Table

Description automatically generated

A piece of paper with writing

Description automatically generated with medium confidence

Question 3) For the cluster it’s K = 4, I choose Grace, David, Jared, and Claire as seeds (in the respective order).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **(Age, Height)** | **(12, 5)** | **(16, 5.6)** | **(27, 6.1)** | **(8, 4.5)** | **Cluster** |
|  |  | Distance mean 1 | Distance mean 2 | Distance mean 3 | Distance mean 4 |  |
| Carlos | (24, 6.2) | 24.00 | 14.00 | 4.00 | 33.00 | 3 |
| Jhon | (2, 2.4) | 36.00 | 46.00 | 62.00 | 27.00 | 4 |
| Jessica | (41, 5.1) | 29.99 | 30.00 | 24.00 | 39.00 | 3 |
| Kennedy | (12, 4.4) | 5.99 | 15.99 | 31.99 | 4.99 | 4 |
| Peter | (19, 6) | 17.00 | 7.00 | 8.99 | 26.00 | 2 |
| Lathia | (17, 5.3) | 7.99 | 3.99 | 18.00 | 17.00 | 2 |
| Nancy | (13,4.8) | 3.00 | 10.99 | 27.00 | 7.99 | 1 |
| Ana | (22,5.8) | 18.00 | 8.00 | 7.99 | 27.00 | 3 |
| Jared | (27, 6.1) | 25.99 | 16.00 | 0.00 | 35.00 | 3 |
| Lebron | (35, 6.6) | 39.00 | 29.00 | 13.00 | 48.00 | 3 |
| David | (16, 5.6) | 9.99 | 0.00 | 16.00 | 18.99 | 2 |
| Henry | (8, 4.6) | 8.00 | 18.00 | 34.00 | 0.99 | 4 |
| Claire | (8, 4.5) | 9.00 | 18.99 | 35.00 | 0.00 | 4 |
| Jude | (10, 4.9) | 2.99 | 12.99 | 28.99 | 6.00 | 1 |
| Grace | (12, 5) | 0.00 | 9.99 | 25.99 | 9.00 | 1 |
| Mason | (14, 5.5) | 7.00 | 2.99 | 18.99 | 16.00 | 2 |
| Blake | (5, 4.3) | 14.00 | 24.00 | 40.00 | 5.00 | 4 |

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| **Iteration #1** | **(Age, Height)** | **(11.67, 4.9)** | **(16.5, 5.6)** | **(27, 6.175)** | **(7, 3.16)** | **Cluster** |
| Name |  | Distance mean 1 | Distance mean 2 | Distance mean 3 | Distance mean 4 |  |
| Carlos | (24, 6.2) | 25.33 | 13.50 | 3.25 | 47.40 | 3 |
| Jhon | (2, 2.4) | 34.67 | 46.50 | 62.75 | 12.60 | 4 |
| Jessica | (41, 5.1) | 31.33 | 29.50 | 19.80 | 53.40 | 3 |
| Kennedy | (12, 4.4) | 5.33 | 16.50 | 33.40 | 17.40 | 1 |
| Peter | (19, 6) | 18.33 | 6.50 | 11.20 | 40.40 | 2 |
| Lathia | (17, 5.3) | 9.33 | 3.50 | 19.40 | 31.40 | 2 |
| Nancy | (13,4.8) | 2.33 | 11.50 | 28.40 | 22.40 | 1 |
| Ana | (22,5.8) | 19.33 | 7.50 | 9.40 | 41.40 | 2 |
| Jared | (27, 6.1) | 27.33 | 15.50 | 4.20 | 49.40 | 3 |
| Lebron | (35, 6.6) | 40.33 | 28.50 | 11.60 | 62.40 | 3 |
| David | (16, 5.6) | 11.33 | 0.50 | 17.40 | 33.40 | 2 |
| Henry | (8, 4.6) | 6.67 | 18.50 | 34.75 | 15.40 | 1 |
| Claire | (8, 4.5) | 7.67 | 19.50 | 36.40 | 14.40 | 1 |
| Jude | (10, 4.9) | 1.67 | 13.50 | 30.40 | 20.40 | 1 |
| Grace | (12, 5) | 1.33 | 10.50 | 27.40 | 23.40 | 1 |
| Mason | (14, 5.5) | 8.33 | 3.50 | 20.40 | 30.40 | 2 |
| Blake | (5, 4.3) | 12.67 | 24.50 | 41.40 | 13.40 | 1 |
|  |  |  |  |  |  |  |
| **Iteration #2** | **(Age, Height)** | **(9.71, 4.64)** | **(15.2, 5.64)** | **(31.75, 6)** | **(2, 2.4)** | **Cluster** |
| Name |  | Distance mean 1 | Distance mean 2 | Distance mean 3 | Distance mean 4 |  |
| Carlos | (24, 6.2) | 25.33 | 13.50 | 8.20 | 47.40 | 3 |
| Jhon | (2, 2.4) | 34.67 | 46.50 | 63.40 | 12.60 | 4 |
| Jessica | (41, 5.1) | 31.33 | 29.50 | 19.80 | 53.40 | 3 |
| Kennedy | (12, 4.4) | 5.33 | 16.50 | 33.40 | 17.40 | 1 |
| Peter | (19, 6) | 18.33 | 6.50 | 11.20 | 40.40 | 2 |
| Lathia | (17, 5.3) | 9.33 | 3.50 | 19.40 | 31.40 | 2 |
| Nancy | (13,4.8) | 2.33 | 11.50 | 28.40 | 22.40 | 1 |
| Ana | (22,5.8) | 19.33 | 7.50 | 9.40 | 41.40 | 2 |
| Jared | (27, 6.1) | 27.33 | 15.50 | 4.20 | 49.40 | 3 |
| Lebron | (35, 6.6) | 40.33 | 28.50 | 11.60 | 62.40 | 3 |
| David | (16, 5.6) | 11.33 | 0.50 | 17.40 | 33.40 | 2 |
| Henry | (8, 4.6) | 6.67 | 18.50 | 35.40 | 15.40 | 1 |
| Claire | (8, 4.5) | 7.67 | 19.50 | 36.40 | 14.40 | 1 |
| Jude | (10, 4.9) | 1.67 | 13.50 | 30.40 | 20.40 | 1 |
| Grace | (12, 5) | 1.33 | 10.50 | 27.40 | 23.40 | 1 |
| Mason | (14, 5.5) | 8.33 | 3.50 | 20.40 | 30.40 | 2 |
| Blake | (5, 4.3) | 12.67 | 24.50 | 41.40 | 13.40 | 1 |

We can stop at the second iteration since there are no more changes, all points stay in the same cluster. The new centers are and

Question 4)