CZ4041: Tutorial Week 10

Due on March 25, 2021 at 8:30am

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Problem 1

Given the distance matrix shown in Table 1, use a dendrogram to show how to perform agglomerative hierarchical clusturing algorithm with Single Link on the distance matrix.

Table 1: Distance matrix.

	P1	P2	P3	P4	P5
P1	0	0.9	0.1	0.65	0.2
P2	0.9	0	0.7	0.6	0.5
P3	0.1	0.7	0	0.4	0.3
P4	0.65	0.6	0.4	0	0.8
P5	0.2	0.5	0.3	0.8	0

Solution

1) Merge P1 & P3 (0.1)

	P1&P3	P2	P4	P5
P1&P3	0	0.7	0.4	0.2
P2	0.7	0	0.6	0.5
P4	0.4	0.6	0	0.8
P5	0.2	0.5	0.8	0

2) Merge P1/P3 & P5 (0.2)

	P1/P3/P5	P2	P4
P1/P3/P5	0	0.5	0.4
P2	0.5	0	0.6
P4	0.4	0.6	0

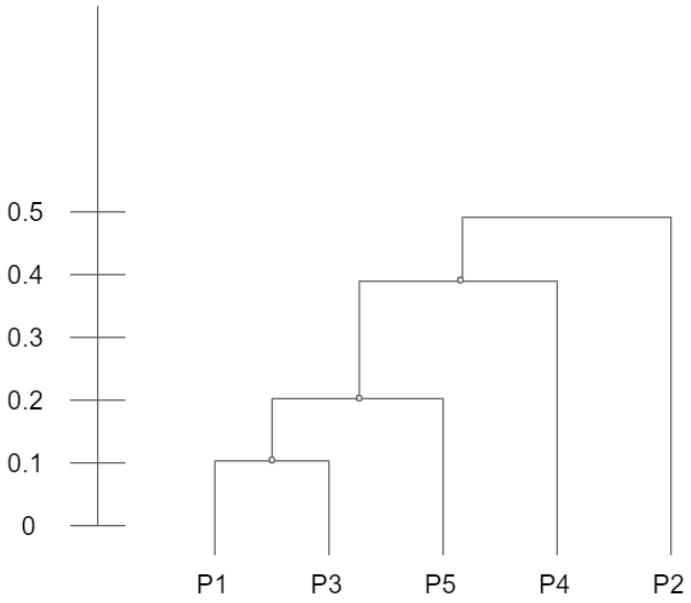
3) Merge P1/P3/P5 & P4 (0.4)

	P1/P3/P4/P5	P2
P1/P3/P4/P5	0	0.5
P2	0.5	0

4) Merge P1/P3/P4/P5 & P2 (0.5)

Therefore, the dendrogram showing the hierarchical clustering is shown below:

Problem 1 continued on next page...


0.5
0.4
0.3
0.2
0.1
0
P1
P3
P5
P4
P2

Problem 2

On the 59th page of the lecture notes "Lecture 10", use a dendrogram to show how to perform hierarchical clustering with Complete Link on the similarity matrix.

	P1	P2	P3	P4	P5
P1	1.00	0.90	0.10	0.65	0.20
P2	0.90	1.00	0.70	0.60	0.50
P3	0.10	0.70	1.00	0.40	0.30
P4	0.65	0.60	0.40	1.00	0.80
P5	0.20	0.50	0.30	0.80	1.00

Similarity matrix

Solution

1) Merge P1 & P2 (0.9)

	P1&P2	P3	P4	P5
P1&P2	1	0.1	0.6	0.2
P3	0.1	1	0.4	0.3
P4	0.6	0.4	1	0.8
P5	0.2	0.3	0.8	1

2) Merge P4 & P5 (0.8)

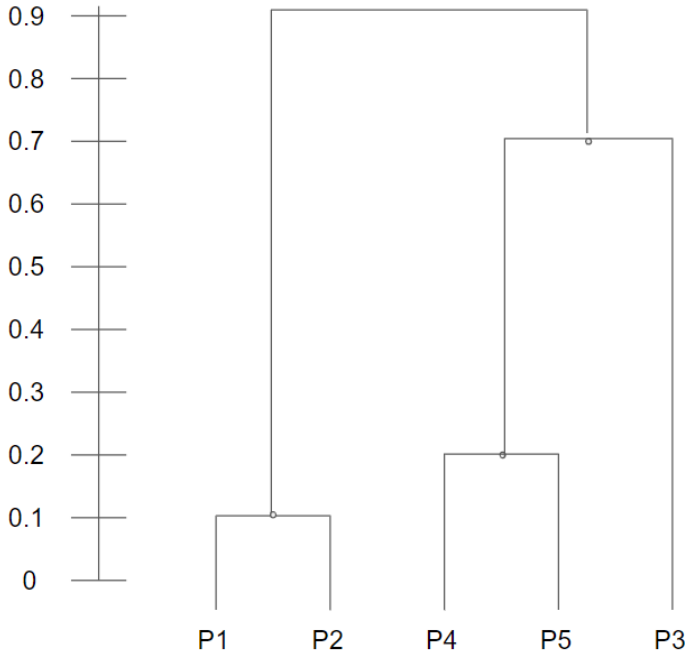
	P1&P2	P3	P4&P5
P1&P2	1	0.1	0.2
P3	0.1	1	0.3
P4&P5	0.2	0.3	1

3) Merge P4/P5 & P3 (0.3)

	P1&P2	P3&P4&P5
P1&P2	1	0.1
P3&P4&P5	0.1	1

4) Merge P1/P2 & P3/P4/P5 (0.1)

Therefore, the dendrogram showing the hierarchical clustering is shown below:


0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
P1
P2
P4
P5
P3