MACHINE LEARNING SOLUTION

Q1 to Q12 have only one correct answer. Choose the correct option to answer your question.

1. Which of the following is an application of clustering?
   Ans.
   a. Biological network analysis

2. On which data type, we cannot perform cluster analysis?
   Ans.
   a. None

3. Netflix's movie recommendation system uses-
   Ans.
   c. Reinforcement learning and Unsupervised learning

4. The final output of Hierarchical clustering is-
   Ans.
   a. The tree representing how close the data points are to each other

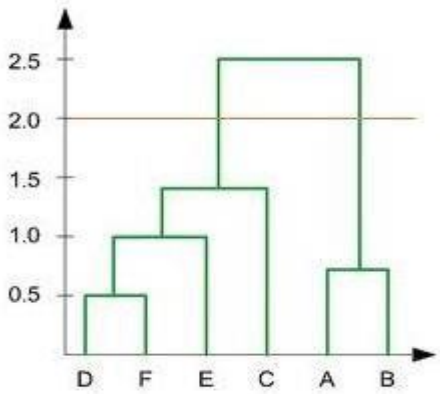
5. Which of the step is not required for K-means clustering?
   Ans.
   d. None

6. Which is the following is wrong?
   Ans.
   c.k-nearest neighbour is same as k-means

7. Which of the following metrics, do we have for finding dissimilarity between two clusters in hierarchical clustering?
   i. Single-link
   ii. Complete-link
   iii. Average-link Options:
   Ans.
   a.1, 2 and 3

8. Which of the following are true?
   i. Clustering analysis is negatively affected by multicollinearity of features
   ii. Clustering analysis is negatively affected by heteroscedasticity Options:
   Ans.
   d. None of them

9. In the figure above, if you draw a horizontal line on y-axis for y=2. What will be the number of clusters formed?



Ans. a. 2

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10. For which of the following tasks might clustering be a suitable approach?

Ans.

b.Given a database of information about your users, automatically group them into different market segments.

11. Given, six points with the following attributes:

point	x coordinate	y coordinate
p1	0.4005	0.5306
p2	0.2148	0.3854
p3	0.3457	0.3156
p4	0.2652	0.1875
p5	0.0789	0.4139
p6	0.4548	0.3022

Table : X-Y coordinates of six points.

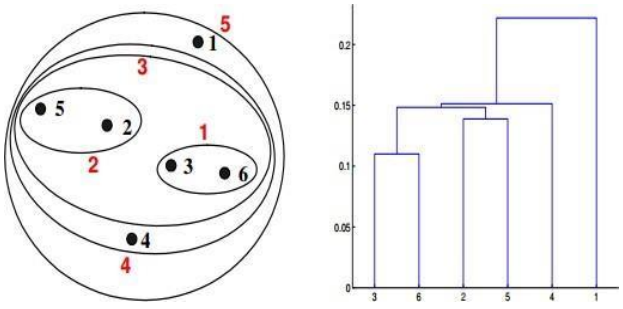
	p1	p2	p3	p4	p5	p6
p1	0.0000	0.2357	0.2218	0.3688	0.3421	0.2347
p2	0.2357	0.0000	0.1483	0.2042	0.1388	0.2540
p3	0.2218	0.1483	0.0000	0.1513	0.2843	0.1100
p4	0.3688	0.2042	0.1513	0.0000	0.2932	0.2216
p5	0.3421	0.1388	0.2843	0.2932	0.0000	0.3921
p6	0.2347	0.2540	0.1100	0.2216	0.3921	0.0000

Table : Distance Matrix for Six Points

Which of the following clustering representations and dendrogram depicts the use of MIN or Single link proximity function in hierarchical clustering:

Ans.

a.



MACHINE LEARNING SOLUTION

12. Given, six points with the following attributes:

point	x coordinate	y coordinate
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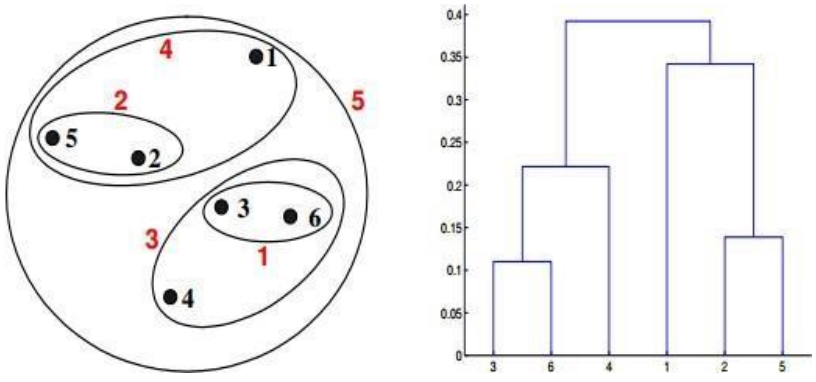
p4	0.3688	0.2042	0.1513	0.0000	0.2932	0.2216
p5	0.3421	0.1388	0.2843	0.2932	0.0000	0.3921
p6	0.2347	0.2540	0.1100	0.2216	0.3921	0.0000

Table : Distance Matrix for Six Points

Which of the following clustering representations and dendrogram depicts the use of MAX or Complete link proximity function in hierarchical clustering.

Ans.

b.



Q13 to Q14 are subjective answers type questions,

13. What is the importance of clustering?

Ans.

Clustering is used to identify groups of similar objects in datasets with two or more variable quantities. In practice, this data may be collected from marketing, biomedical, or geospatial databases, among many other places. The factors analysed through clustering can have a big impact on sales and customer satisfaction, making it an invaluable tool to boost revenue, cut costs, or sometimes even both.

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14. How can I improve my clustering performance?
    Ans.
    Graph-based clustering performance can easily be improved by applying ICA blind source separation during the graph Laplacian embedding step. Applying unsupervised feature learning to input data using either RICA or SFT, improves clustering performance.