MACHINE LEARNING

1. Which of the following is an application of clustering?
   a. Biological network analysis
   b. Market trend prediction
   c. Topic modeling
   d. All of the above

Ans: - All of the above

2. On which data type, we cannot perform cluster analysis?
   a. Time series data
   b. Text data
   c. Multimedia data
   d. None

Ans: - None

3. Netflix's movie recommendation system uses-
   a. Supervised learning
   b. Unsupervised learning
   c. **Reinforcement learning and Unsupervised learning**
   d. All of the above

Ans: - Reinforcement learning and Unsupervised learning

4. The final output of Hierarchical clustering is-
   a. The number of cluster centroids
   b. The tree representing how close the data points are to each other
   c. A map defining the similar data points into individual groups
   d. All of the above

Ans: - The tree representing how close the data points are to each other

5. Which of the step is not required for K-means clustering?
   a. A distance metric
   b. Initial number of clusters
   c. Initial guess as to cluster centroids
   d. None

Ans: -None

6. Which is the following is wrong?
   a. k-means clustering is a vector quantization method
   b. k-means clustering tries to group n observations into k clusters
   c. **k-nearest neighbour is same as k-means**
   d. None

Ans: - k-nearest neighbour is same as k-means

MACHINE LEARNING

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:

a. 1 and 2
b. 1 and 3
c. 2 and 3
d. 1, 2 and 3

Ans: - 1, 2 and 3

8. Which of the following are true?

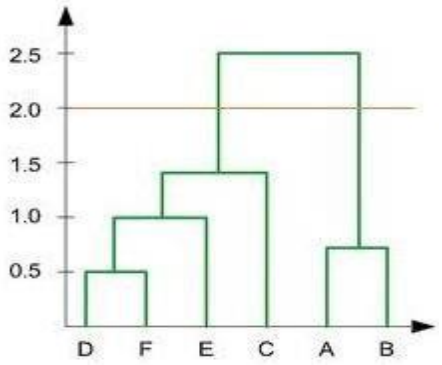
I. Clustering analysis is negatively affected by multicollinearity of features
II. Clustering analysis is negatively affected by heteroscedasticity

Options:

a. 1 only
b. 2 only
c. 1 and 2
d. None of them

Ans: -1 only

MACHINE LEARNING



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?

a. 2
b. 4
c. 3
d. 5

Ans: -2

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

a. Given sales data from a large number of products in a supermarket, estimate future sales for each of these products.
b. Given a database of information about your users, automatically group them into different marketsegments.
c. Predicting whether stock price of a company will increase tomorrow.
d. Given historical weather records, predict if tomorrow's weather will be sunny or rainy.

Ans: - 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.

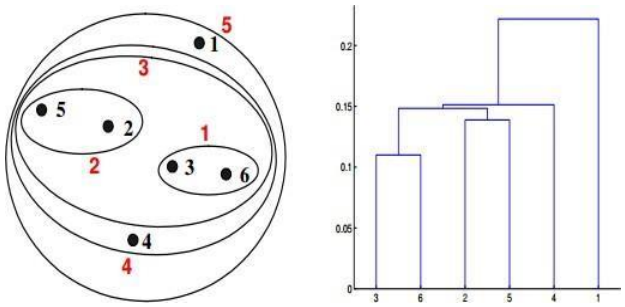
	p1	p2	p3	p4	p5	p6
p1	0.0000	0.2357	0.2218	0.3688	0.3421	0.2347
p2	0.2357	0.0000	0.1483	0.2042	0.1388	0.2540
p3	0.2218	0.1483	0.0000	0.1513	0.2843	0.1100
p4	0.3688	0.2042	0.1513	0.0000	0.2932	0.2216
p5	0.3421	0.1388	0.2843	0.2932	0.0000	0.3921
p6	0.2347	0.2540	0.1100	0.2216	0.3921	0.0000

Table : Distance Matrix for Six Points

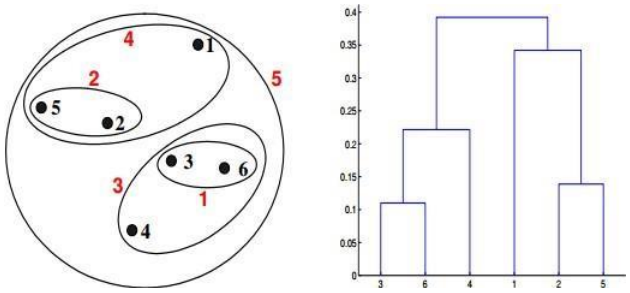
MACHINE LEARNING

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

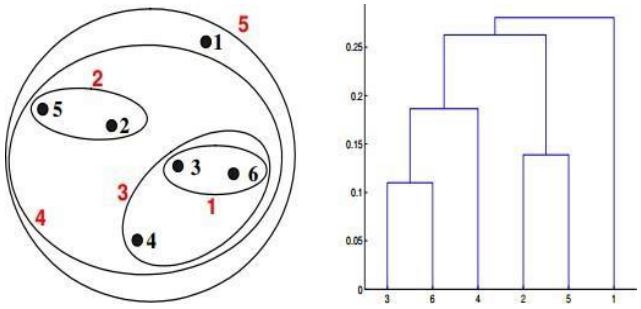
a.



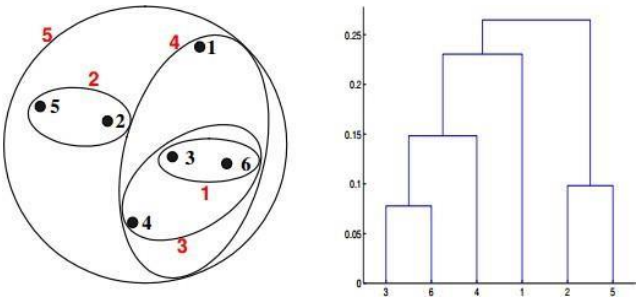
b.



c.



d.



Ans: -A

MACHINE LEARNING

12. Given, six points with the following attributes:

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

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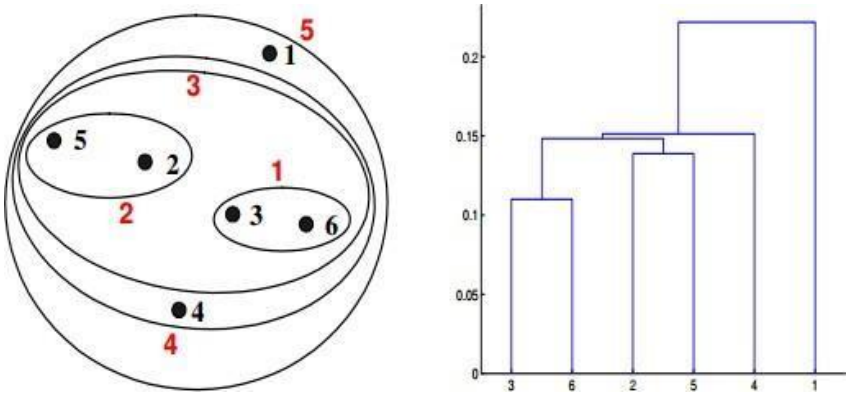
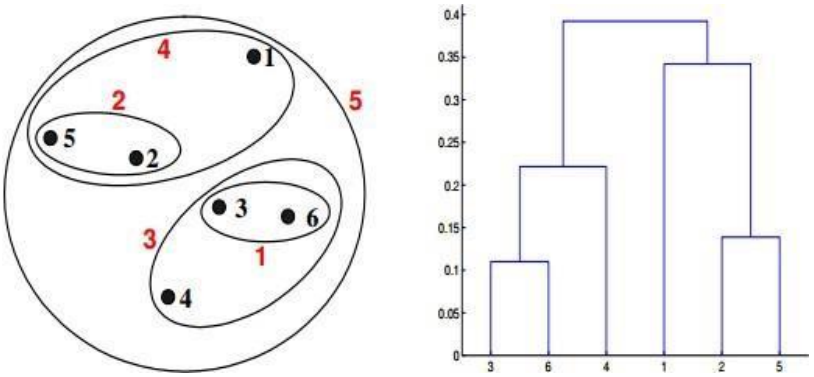
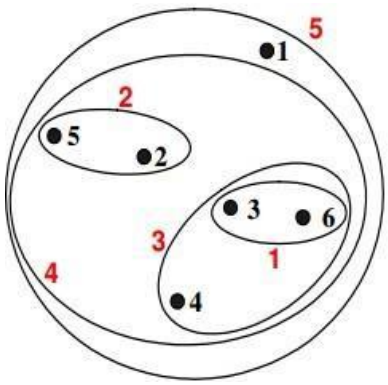
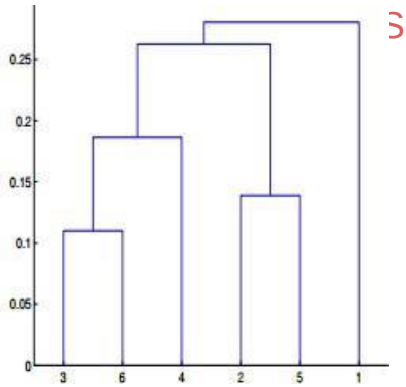


b.

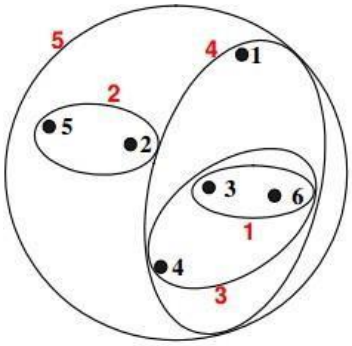


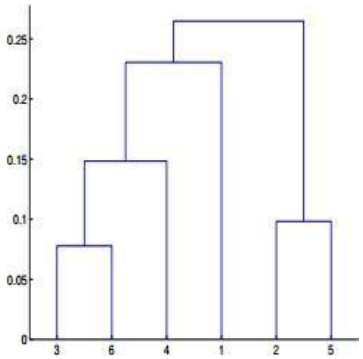
c.





d.





Ans: - B

13. What is the importance of clustering?

- Having clustering methods helps in restarting the local search procedure and remove the inefficiency. In addition, clustering helps to determine the internal structure of the data.
- This clustering analysis has been used for model analysis, vector region of attraction.
- Clustering helps in understanding the natural grouping in a dataset. Their purpose is to make sense to partition the data into some group of logical groupings.
- Clustering quality depends on the methods and the identification of hidden patterns.
- They play a wide role in applications like marketing economic research and weblogs to identify similarity measures, Image processing, and spatial research.
- They are used in outlier detections to detect credit card fraudulence.

14. How can I improve my clustering performance?

Clustering analysis is one of the main analytical methods in data mining. K-means is the most popular and partition-based clustering algorithm. But it is computationally expensive and the quality of resulting clusters heavily depends on the selection of initial centroid and the dimension of the data. Several methods have been proposed in the literature for improving performance of the k-means clustering algorithm. Principal Component Analysis (PCA) is an important approach to unsupervised dimensionality reduction technique. This paper proposed a method to make the algorithm more effective and efficient by using PCA and modified k-means. In this paper, we have used Principal Component Analysis as a first phase to find the initial centroid for k-means and for dimension reduction and k-means method is modified by using heuristics approach to reduce the number of distance calculation to assign the data-point to cluster. By comparing the results of original and new approach, it was found that the results obtained are more effective, easy to understand and above all, the time taken to process the data was substantially reduced.