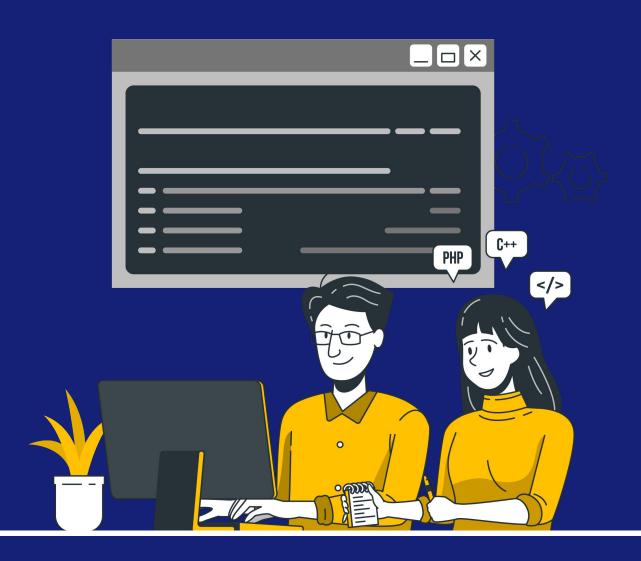


Assignment - 5

ML





- 1. What is clustering in machine learning?
- 2. Explain the difference between supervised and unsupervised clustering.
- 3. What are the key applications of clustering algorithms?
- 4. Describe the K-means clustering algorithm.
- 5. What are the main advantages and disadvantages of K-means clustering?
- 6. How does hierarchical clustering work?
- 7. What are the different linkage criteria used in hierarchical clustering?
- 8. Explain the concept of DBSCAN clustering.
- 9. What are the parameters involved in DBSCAN clustering?
- 10. Describe the process of evaluating clustering algorithms.
- 11. What is the silhouette score, and how is it calculated?
- 12. Discuss the challenges of clustering high-dimensional data.
- 13. Explain the concept of density-based clustering.
- 14. How does Gaussian Mixture Model (GMM) clustering differ from K-means?
- 15. What are the limitations of traditional clustering algorithms?
- 16. Discuss the applications of spectral clustering.
- 17. Explain the concept of affinity propagation.
- 18. How do you handle categorical variables in clustering?
- 19. Describe the elbow method for determining the optimal number of clusters.
- 20. What are some emerging trends in clustering research?
- 21. What is anomaly detection, and why is it important?
- 22. Discuss the types of anomalies encountered in anomaly detection.
- 23. Explain the difference between supervised and unsupervised anomaly detection techniques.
- 24. Describe the Isolation Forest algorithm for anomaly detection.
- 25. How does One-Class SVM work in anomaly detection?
- 26. Discuss the challenges of anomaly detection in high-dimensional data.
- 27. Explain the concept of novelty detection.
- 28. What are some real-world applications of anomaly detection?



- 29. Describe the Local Outlier Factor (LOF) algorithm.
- 30. How do you evaluate the performance of an anomaly detection model?
- 31. Discuss the role of feature engineering in anomaly detection.
- 32. What are the limitations of traditional anomaly detection methods?
- 33. Explain the concept of ensemble methods in anomaly detection.
- 34. How does autoencoder-based anomaly detection work?
- 35. What are some approaches for handling imbalanced data in anomaly detection?
- 36. Describe the concept of semi-supervised anomaly detection.
- 37. Discuss the trade-offs between false positives and false negatives in anomaly detection.
- 38. How do you interpret the results of an anomaly detection model?
- 39. What are some open research challenges in anomaly detection?
- 40. Explain the concept of contextual anomaly detection.
- 41. What is time series analysis, and what are its key components?
- 42. Discuss the difference between univariate and multivariate time series analysis.
- 43. Describe the process of time series decomposition.
- 44. What are the main components of a time series decomposition?
- 45. Explain the concept of stationarity in time series data.
- 46. How do you test for stationarity in a time series?
- 47. Discuss the autoregressive integrated moving average (ARIMA) model.
- 48. What are the parameters of the ARIMA model?
- 49. Describe the seasonal autoregressive integrated moving average (SARIMA) model.
- 50. How do you choose the appropriate lag order in an ARIMA model?
- 51. Explain the concept of differencing in time series analysis.
- 52. What is the Box-Jenkins methodology?
- 53. Discuss the role of ACF and PACF plots in identifying ARIMA parameters.
- 54. How do you handle missing values in time series data?
- 55. Describe the concept of exponential smoothing.
- 56. What is the Holt-Winters method, and when is it used?



- 57. Discuss the challenges of forecasting long-term trends in time series data.
- 58. Explain the concept of seasonality in time series analysis.
- 59. How do you evaluate the performance of a time series forecasting model?
- 60. What are some advanced techniques for time series forecasting?