Assignment 3

1. d) Collinearity.
2. b) Random Forest

   Random Forest is a machine learning algorithm that is based on the idea of bagging (bootstrap aggregating). Bagging is an ensemble learning technique that combines multiple models to make predictions
3. c) Decision Tree are prone to overfit
4. c) Training data
5. c) Anamoly detection
6. c) Case based
7. d) Both a and b
   a. Statistical learning theory
   b. Computational learning theory
8. c) Both a and b
   a. Curse of dimensionality
   b. Calculate the distance of test case for all training cases
9. b) 2

   The input layer and the hidden layer.

10. d) KMeans

    KMeans is a clustering algorithm, which falls under the category of unsupervised learning. Clustering algorithms aim to group similar data points together based on the intrinsic structure of the data, without any labeled information or target variable.

11. c) Neither feature nor number of groups is known

    Unsupervised learning is a type of machine learning where the objective is to find patterns, structures, or relationships in a dataset without any labeled or explicitly provided target variable. In unsupervised learning, the algorithm explores the data on its own to discover meaningful information or clusters without being guided by predefined labels or outcomes.

12. b) SVG

    SVG is not a recognized machine learning algorithm. It does not correspond to any commonly used or established technique in the field of machine learning.

13. b) Underfitting
14. a) Reinforcement learning
15. b) Mean squared error
16. a) Linear, binary
17. A. supervised learning
    Supervised learning is a type of machine learning where the algorithm learns from labeled training data, which includes input features and corresponding target labels or outcomes. In the given scenario, the reviews of Netflix series are marked as positive, negative, or neutral, indicating the target labels.
18. C. both a and b
    a. euclidean distance
    b. manhattan distance

19. D. none of these
20. C. input attribute.

    Both supervised learning and unsupervised clustering require input attributes, also known as features or independent variables. These input attributes represent the information or characteristics of the data points or instances being analyzed.

21. (A) SVM allows very low error in classification

    A hard margin SVM seeks to achieve perfect classification, where all data points from one class are on one side of the decision boundary, and all data points from the other class are on the opposite side. This implies that the SVM allows very low error or misclassification in the classification process.

22. (B) Only 2

    Depth of Tree

23. (A) -(6/10 log(6/10) + 4/10 log(4/10))

    To calculate the entropy of the target variable, we need to determine the proportion of each class within the dataset and compute the entropy based on those proportions.

    In this case, we have 6 instances of class 0 and 4 instances of class 1 out of a total of 10 instances.

    The formula for entropy is:

    Entropy = -p1 log(p1) - p2 log(p2) - ...pn log(pn)

    where p1, p2, ... are the proportions of each class.

    Using the given values, we can calculate the entropy as follows:

    Entropy = -(6/10 log(6/10) + 4/10 log(4/10))

    Therefore, the correct answer is (A) -(6/10 log(6/10) + 4/10 log(4/10)).

24. (A) weights are regularized with the l1 norm

25. (D) Perceptron

26. D) Either 2 or 3

    2. Instead of deleting both variables, we can simply delete one.

    3. Removing correlated variables may result in information loss. We may utilize penalized regression models such as ridge or lasso regression to keep such variables.

27. (B) increase by 5 pounds
28. (D) Minimize the squared distance from the points

The line described by the linear regression equation using Ordinary Least Squares (OLS) aims to minimize the sum of the squared differences between the predicted values and the actual values of the dependent variable.

29. (B) As the value of one attribute increases the value of the second attribute also increases

    correlation coefficient of 0.85 suggests a strong positive linear relationship, meaning that as the value of one attribute increases, the value of the second attribute tends to increase as well. The closer the correlation coefficient is to 1, the stronger the linear relationship between the attributes.

30. (B) Convolutional Neural Network

    CNNs excel at capturing spatial and local patterns in images through the use of convolutional layers, pooling layers, and nonlinear activation functions.