1.What is Machine learning?

a) The autonomous acquisition of knowledge through the use of computer programs

b) The autonomous acquisition of knowledge through the use of manual programs

c) The selective acquisition of knowledge through the use of computer programs

d) The selective acquisition of knowledge through the use of manual programs

Answer: a

Explanation: Machine learning is the autonomous acquisition of knowledge through the use of computer programs.

2. Which of the factors affect the performance of learner system does not include?

a) Representation scheme used

b) Training scenario

c) Type of feedback

d) Good data structures

Answer: d

Explanation: Factors that affect the performance of learner system does not include good data structures.

3. Different learning methods does not include?

a) Memorization

b) Analogy

c) Deduction

d) Introduction

Answer: d

Explanation: Different learning methods does not include the introduction

4. In language understanding, the levels of knowledge that does not include?

a) Phonological

b) Syntactic

c) Empirical

d) Logical

Answer: c

Explanation: In language understanding, the levels of knowledge that does not include empirical knowledge.

5. A model of language consists of the categories which does not include?

a) Language units

b) Role structure of units

c) System constraints

d) Structural units

Answer: d

Explanation: A model of language consists of the categories which does not include structural units.

6. What is a top-down parser?

a) Begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual preterminal symbols are written

b) Begins by hypothesizing a sentence (the symbol S) and successively predicting upper level constituents until individual preterminal symbols are written

c) Begins by hypothesizing lower level constituents and successively predicting a sentence (the symbol S)

d) Begins by hypothesizing upper level constituents and successively predicting a sentence (the symbol S)

Answer: a

Explanation: A top-down parser begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual preterminal symbols are written.

7. Among the following which is not a horn clause?

a) p

b) Øp V q

c) p → q
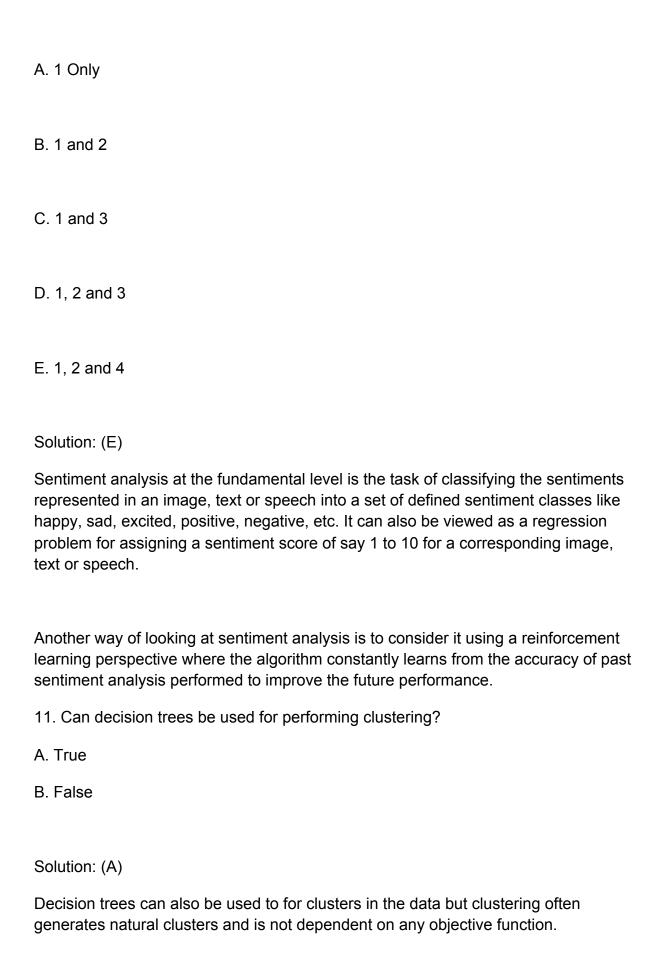
d) p → Øq

Answer: d

Explanation: p → Øq is not a horn clause.

8. The action 'STACK(A, B)' of a robot arm specify to _____

a) Place block B on Block A

b) Place blocks A, B on the table in that order

c) Place blocks B, A on the table in that order

d) Place block A on block B

Answer: d

Explanation: The action 'STACK(A,B)' of a robot arm specify to Place block A on block B.

9. Movie Recommendation systems are an example of:

1. Classification

2. Clustering

3. Reinforcement Learning

4. Regression

Options:

B. A. 2 Only

C. 1 and 2

D. 1 and 3

E. 2 and 3

Answer: (E)

Generally, movie recommendation systems cluster the users in a finite number of similar groups based on their previous activities and profile. Then, at a fundamental level, people in the same cluster are made similar recommendations.

In some scenarios, this can also be approached as a classification problem for assigning the most appropriate movie class to the user of a specific group of users. Also, a movie recommendation system can be viewed as a reinforcement learning problem where it learns by its previous recommendations and improves the future recommendations.

10. Sentiment Analysis is an example of:

1. Regression

2. Classification

3. Clustering

4. Reinforcement Learning

Options:

A. 1 Only

B. 1 and 2

C. 1 and 3

D. 1, 2 and 3

E. 1, 2 and 4

Solution: (E)

Sentiment analysis at the fundamental level is the task of classifying the sentiments represented in an image, text or speech into a set of defined sentiment classes like happy, sad, excited, positive, negative, etc. It can also be viewed as a regression problem for assigning a sentiment score of say 1 to 10 for a corresponding image, text or speech.

Another way of looking at sentiment analysis is to consider it using a reinforcement learning perspective where the algorithm constantly learns from the accuracy of past sentiment analysis performed to improve the future performance.

11. Can decision trees be used for performing clustering?

A. True

B. False

Solution: (A)

Decision trees can also be used to for clusters in the data but clustering often generates natural clusters and is not dependent on any objective function.

12. Which of the following is the most appropriate strategy for data cleaning before performing clustering analysis, given less than desirable number of data points:

1. Capping and flouring of variables

2. Removal of outliers

Options:

A. 1 only

B. 2 only

C. 1 and 2

D. None of the above

Solution: (A)

Removal of outliers is not recommended if the data points are few in number. In this scenario, capping and flouring of variables is the most appropriate strategy.

13. What is the minimum no. of variables/ features required to perform clustering?

A. 0

B. 1

C. 2

D. 3

Solution: (B)

At least a single variable is required to perform clustering analysis. Clustering analysis with a single variable can be visualized with the help of a histogram.

14. A _____ is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility.

a) Decision tree

b) Graphs

c) Trees

d) Neural Networks

Answer: a

Explanation: Refer the definition of Decision tree.

15. What is Decision Tree?

a) Flow-Chart

b) Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label

c) Flow-Chart & Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label

d) None of the mentioned

Answer: c

Explanation: Refer the definition of Decision tree.

16. Decision Trees can be used for Classification Tasks.

a) True

b) False

Answer: a

17. Choose from the following that are Decision Tree nodes?

a) Decision Nodes

b) End Nodes

c) Chance Nodes

d) All of the mentioned

Answer: d

18. Decision Nodes are represented by _____

a) Disks

b) Squares

c) Circles

d) Triangles

Answer: b

19. Chance Nodes are represented by _____

a) Disks

b) Squares

c) Circles

d) Triangles

Answer: c

20. Which of the following are the advantage/s of Decision Trees?

a) Possible Scenarios can be added

b) Use a white box model, If given result is provided by a model

c) Worst, best and expected values can be determined for different scenarios

d) All of the mentioned

Answer: d

21. Why is the XOR problem exceptionally interesting to neural network researchers?

a) Because it can be expressed in a way that allows you to use a neural network

b) Because it is complex binary operation that cannot be solved using neural networks

c) Because it can be solved by a single layer perceptron

d) Because it is the simplest linearly inseparable problem that exists.

Answer: d

22. What is back propagation?

a) It is another name given to the curvy function in the perceptron

b) It is the transmission of error back through the network to adjust the inputs

c) It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn

d) None of the mentioned

Answer: c

Explanation: Back propagation is the transmission of error back through the network to allow weights to be adjusted so that the network can learn.

23. Why are linearly separable problems of interest of neural network researchers?

a) Because they are the only class of problem that network can solve successfully

b) Because they are the only class of problem that Perceptron can solve successfully

c) Because they are the only mathematical functions that are continue

d) Because they are the only mathematical functions you can draw

Answer: b

Explanation: Linearly separable problems of interest of neural network researchers because they are the only class of problem that Perceptron can solve successfully.

24. Which of the following is not the promise of artificial neural network?

a) It can explain result

b) It can survive the failure of some nodes

c) It has inherent parallelism

d) It can handle noise

Answer: a

Explanation: The artificial Neural Network (ANN) cannot explain result.

25. Neural Networks are complex _____ with many parameters.

a) Linear Functions

b) Nonlinear Functions

c) Discrete Functions

d) Exponential Functions

Answer: a

Explanation: Neural networks are complex linear functions with many parameters.

26. A perceptron adds up all the weighted inputs it receives, and if it exceeds a certain value, it outputs a 1, otherwise it just outputs a 0.

a) True

b) False

c) Sometimes – it can also output intermediate values as well

d) Can't say

Answer: a

Explanation: Yes the perceptron works like that.

27. What is the name of the function in the following statement "A perceptron adds up all the weighted inputs it receives, and if it exceeds a certain value, it outputs a 1, otherwise it just outputs a 0"?

a) Step function

b) Heaviside function

c) Logistic function

d) Perceptron function

Answer: b

Explanation: Also known as the step function – so answer 1 is also right. It is a hard thresholding function, either on or off with no in-between.

28. Having multiple perceptrons can actually solve the XOR problem satisfactorily: this is because each perceptron can partition off a linear part of the space itself, and they can then combine their results.

a) True – this works always, and these multiple perceptrons learn to classify even complex problems

b) False – perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do

c) True – perceptrons can do this but are unable to learn to do it – they have to be explicitly hand-coded

d) False – just having a single perceptron is enough

Answer: c

29. The network that involves backward links from output to the input and hidden layers is called _____

a) Self organizing maps

b) Perceptrons

c) Recurrent neural network

d) Multi layered perceptron

Answer: c

Explanation: RNN (Recurrent neural network) topology involves backward links from output to the input and hidden layers.

30. Which of the following is an application of NN (Neural Network)?

a) Sales forecasting

b) Data validation

c) Risk management

d) All of the mentioned

Answer: d

Explanation: All mentioned options are applications of Neural Network.

31. What is perceptron?

a) a single layer feed-forward neural network with pre-processing

b) an auto-associative neural network

c) a double layer auto-associative neural network

d) a neural network that contains feedback

Answer: a

Explanation: The perceptron is a single layer feed-forward neural network. It is not an auto-associative network because it has no feedback and is not a multiple layer neural network because the pre-processing stage is not made of neurons.

32. What is an auto-associative network?

a) a neural network that contains no loops

b) a neural network that contains feedback

c) a neural network that has only one loop

d) a single layer feed-forward neural network with pre-processing

Answer: b

Explanation: An auto-associative network is equivalent to a neural network that contains feedback. The number of feedback paths(loops) does not have to be one.

33. A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. What will be the output?

a) 238

b) 76

c) 119

d) 123

Answer: a

Explanation: The output is found by multiplying the weights with their respective inputs, summing the results and multiplying with the transfer function. Therefore:

Output = 2 * (1*4 + 2*10 + 3*5 + 4*20) = 238.

34. Which of the following is true?

(i) On average, neural networks have higher computational rates than conventional computers.

(ii) Neural networks learn by example.

(iii) Neural networks mimic the way the human brain works.

a) All of the mentioned are true

b) (ii) and (iii) are true

c) (i), (ii) and (iii) are true

d) None of the mentioned

Answer: a

Explanation: Neural networks have higher computational rates than conventional computers because a lot of the operation is done in parallel. That is not the case when the neural network is simulated on a computer. The idea behind neural nets is based on the way the human brain works. Neural nets cannot be programmed, they can only learn by examples.

35. Which of the following is true for neural networks?

(i) The training time depends on the size of the network.

(ii) Neural networks can be simulated on a conventional computer.

(iii) Artificial neurons are identical in operation to biological ones.

a) All of the mentioned

b) (ii) is true

c) (i) and (ii) are true

d) None of the mentioned

Answer: c

Explanation: The training time depends on the size of the network; the number of neuron is greater and therefore the number of possible 'states' is increased. Neural networks can be simulated on a conventional computer but the main advantage of neural networks – parallel execution – is lost. Artificial neurons are not identical in operation to the biological ones.

36. What are the advantages of neural networks over conventional computers?

(i) They have the ability to learn by example

(ii) They are more fault tolerant

(iii)They are more suited for real time operation due to their high 'computational' rates

a) (i) and (ii) are true

b) (i) and (iii) are true

c) Only (i)

d) All of the mentioned

Answer: d

Explanation: Neural networks learn by example. They are more fault tolerant because they are always able to respond and small changes in input do not normally cause a change in output. Because of their parallel architecture, high computational rates are achieved.

37. Which of the following is true?

Single layer associative neural networks do not have the ability to:

(i) perform pattern recognition

(ii) find the parity of a picture

(iii)determine whether two or more shapes in a picture are connected or not

a) (ii) and (iii) are true

b) (ii) is true

c) All of the mentioned

d) None of the mentioned

Answer: a

Explanation: Pattern recognition is what single layer neural networks are best at but they don't have the ability to find the parity of a picture or to determine whether two shapes are connected or not.

38. Which is true for neural networks?

a) It has set of nodes and connections

b) Each node computes it's weighted input

c) Node could be in excited state or non-excited state

d) All of the mentioned

Answer: d

Explanation: All mentioned are the characteristics of neural network.

39. What is Neuro software?

a) A software used to analyze neurons

b) It is powerful and easy neural network

c) Designed to aid experts in real world

d) It is software used by Neurosurgeon

Answer: b

40. A _____ is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility.

a) Decision tree

b) Graphs

c) Trees

d) Neural Networks

Answer: a

Explanation: Refer the definition of Decision tree.

41. Decision Tree is a display of an algorithm.

a) True

b) False

Answer: a

Explanation: None.

42. What is Decision Tree?

a) Flow-Chart

b) Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label

c) Flow-Chart & Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label

d) None of the mentioned

Answer: c

Explanation: Refer the definition of Decision tree.

43. Decision Trees can be used for Classification Tasks.

a) True

b) False

Answer: a

44. Choose from the following that are Decision Tree nodes?

a) Decision Nodes

b) End Nodes

c) Chance Nodes

d) All of the mentioned

Answer: d

45. Decision Nodes are represented by _____

a) Disks

b) Squares

c) Circles

d) Triangles

Answer: b

46. Chance Nodes are represented by _____

a) Disks

b) Squares

c) Circles

d) Triangles

Answer: c

47. Which of the following are the advantage/s of Decision Trees?

a) Possible Scenarios can be added

b) Use a white box model, If given result is provided by a model

c) Worst, best and expected values can be determined for different scenarios

d) All of the mentioned

Answer: d

48. Which of the following is also called as exploratory learning?

a) Supervised learning

b) Active learning

c) Unsupervised learning

d) Reinforcement learning

Answer: c

Explanation: In unsupervised learning, no teacher is available hence it is also called unsupervised learning.

49. Which of the following method is used for finding optimal of cluster in K-Mean algorithm?

a) Elbow method

b) Manhattan method

c) Ecludian mehthod

d) All of the above

e) None of these

Solution: a

Out of the given options, only elbow method is used for finding the optimal number of clusters. The elbow method looks at the percentage of variance explained as a function of the number of clusters: One should choose a number of clusters so that adding another cluster doesn't give much better modeling of the data.

50. Which of the following sequences is correct for a K-Means algorithm using Forgy method of initialization?

Specify the number of clusters

Assign cluster centroids randomly

Assign each data point to the nearest cluster centroid

Re-assign each point to nearest cluster centroids

Re-compute cluster centroids

Options:

a) 1, 2, 3, 5, 4

b) 1, 3, 2, 4, 5

c) 2, 1, 3, 4, 5

d) None of these

Solution: a

The methods used for initialization in K means are Forgy and Random Partition. The Forgy method randomly chooses k observations from the data set and uses these as the initial means. The Random Partition method first randomly assigns a cluster to each observation and then proceeds to the update step, thus computing the initial mean to be the centroid of the cluster's randomly assigned points.