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Week 6: Assignment 6

The due date for submitting this assignment has passed.

Due on 2023-09-06, 23:59 IST.

As per our records you have not submitted this assignment.

1) Which of the following is/are major advantages of decision trees over other supervised learning techniques? (Note that more than one choices may be correct) ***1 point***

- Theoretical guarantees of performance
- Higher performance
- Interpretability of classifier
- More powerful in its ability to represent complex functions

No, the answer is incorrect.
Score: 0
Accepted Answers:
Interpretability of classifier

2) Increasing the pruning strength in a decision tree by reducing the maximum depth: ***1 point***

- Will always result in improved validation accuracy.
- Will lead to more overfitting.
- Might lead to underfitting if set too aggressively.
- Will have no impact on the tree's performance.
- Will eliminate the need for validation data.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Might lead to underfitting if set too aggressively.

3) Consider the following statements: ***1 point***

Statement 1: Decision Trees are linear non-parametric models.

Statement 2: A decision tree may be used to explain the complex function learned by a neural network.

- Both the statements are True.
- Statement 1 is True, but Statement 2 is False.
- Statement 1 is False, but Statement 2 is True.
- Both the statements are False.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Statement 1 is False, but Statement 2 is True.

4) Consider the following dataset: ***2 points***

Age	Vaccination	Tumor Size	Tumor Site	Malignant
5	1	Small	Shoulder	0
9	1	Small	Knee	0
6	0	Small	Marrow	0
6	1	Medium	Chest	0
7	0	Medium	Shoulder	0
8	1	Large	Shoulder	0
5	1	Large	Liver	0
9	0	Small	Liver	1
8	0	Medium	Shoulder	1
8	0	Medium	Shoulder	1
6	0	Small	Marrow	1
7	0	Small	Chest	1

What is the initial entropy of Malignant?

- 0.543
- 0.9798
- 0.8732
- 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.9798

5) For the same dataset, what is the info gain of Vaccination? ***2 points***

- 0.4763
- 0.2102
- 0.1134
- 0.9355

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.4763

6) Which of the following machine learning models can solve the XOR problem without any transformations on the input space? ***1 point***

- [ ] Linear Perceptron
- [ ] Neural Networks
- [ ] Decision Trees
- [ ] Logistic Regression

No, the answer is incorrect.
Score: 0

Accepted Answers:
Neural Networks
Decision Trees

7) Statement: Decision Tree is an unsupervised learning algorithm. ***1 point***
Reason: The splitting criterion use only the features of the data to calculate their respective measures

- ( ) Statement is True. Reason is True.
- ( ) Statement is True. Reason is False.
- ( ) Statement is False. Reason is True.
- ( ) Statement is False. Reason is False.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Statement is False. Reason is False.

8) _____ is a measurement of likelihood of an incorrect classification of a new instance for a random variable, if the new instance is randomly classified as per the distribution of class labels from the data set. ***1 point***

- ( ) Gini impurity.
- ( ) Entropy.
- ( ) Information gain.
- ( ) None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Gini impurity.

9) What is a common indicator of overfitting in a decision tree? ***1 point***

- ( ) The training accuracy is high while the validation accuracy is low.
- ( ) The tree is shallow.
- ( ) The tree has only a few leaf nodes.
- ( ) The tree's depth matches the number of attributes in the dataset.
- ( ) The tree's predictions are consistently biased.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The training accuracy is high while the validation accuracy is low.

10) Consider a dataset with only one attribute(categorical). Suppose, there are 10 unordered values in this attribute, how many possible combinations are needed to find the best split-point for building the decision tree classifier? (considering only binary splits) ***1 point***

- 10
- 511
- 1023
- 512

No, the answer is incorrect.
Score: 0

Accepted Answers:
511