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 NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Introduction To Machine Learning (course)

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Course outline

 How does an
NPTEL
online
course
work? ()

Week 0 ()

Week 1 ()

Week 2 ()

Week 3 ()

Week 4 ()

Week 5 ()

Week 6 ()

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:

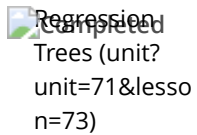
Might lead to underfitting if set too aggressively.

3) Consider the following statements:

1 point

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

- Decision Trees - Introduction (unit? unit=71&less n=72)



- Decision Trees - Stopping Criteria and Pruning (unit? unit=71&less n=74)

- Decision Trees for Classification - Loss Functions (unit? unit=71&less n=75)

- Decision Trees - Categorical Attributes (unit? unit=71&less n=76)

- Decision Trees - Multiway Splits (unit? unit=71&less n=77)

- Decision Trees - Missing Values, Imputation, Surrogate Splits (unit? unit=71&less n=78)

- Decision Trees - Instability, Smoothness, Repeated Subtrees (unit? unit=71&less n=79)

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**

☐ Decision Trees
- Example
(unit?
unit=71&less
n=80)

☐ Practice:
Week 6:
Assignment 6
(Non Graded)
(assessment?
name=181)

☐ Quiz: Week 6:
Assignment 6
(assessment?
name=216)

☐ Week 6
Feedback
Form :
Introduction
To Machine
Learning
(unit?
unit=71&less
n=194)

☐ Week 6:
Solution (unit?
unit=71&less
n=218)

Week 7 ()

Week 8 ()

Week 9 ()

**Text
Transcripts ()**

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Books ()

**Problem
Solving
Session -
July 2023 ()**

- ☐ 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 **1 point** 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)

- ☐ 10
- ☐ 511
- ☐ 1023
- ☐ 512

No, the answer is incorrect.

Score: 0

Accepted Answers:

511