

Module 4 Quiz

Total points 10

Question 1

Which of the following is an example of clustering?

- ☐ Creating a new representation of the data with fewer features
- ☐ Compress elongated clouds of data into more spherical representations
- ☒ Separate the data into distinct groups by similarity
- ☐ Accumulate data into groups based on labels

Question 2

Which of the following are advantages to using decision trees over other models? (Select all that apply)

- ☒ Trees are easy to interpret and visualize
- ☒ Trees often require less preprocessing of data
- ☐ Decision trees can learn complex statistical models using a variety of kernel functions
- ☐ Trees are naturally resistant to overfitting

Question 3

What is the main reason that each tree of a random forest only looks at a random subset of the features when building each node?

- ☐ To learn which features are not strong predictors
- ☐ To reduce the computational complexity associated with training each of the trees needed for the random forest.
- ☐ To increase interpretability of the model
- ☒ To improve generalization by reducing correlation among the trees and making the model more robust to bias

Question 4

Which of the following supervised machine learning methods are greatly affected by feature scaling? (Select all that apply)

- ☐ Naive Bayes
- ☒ Neural Networks
- ☒ Support Vector Machines
- ☐ Decision Trees
- ☒ KNN

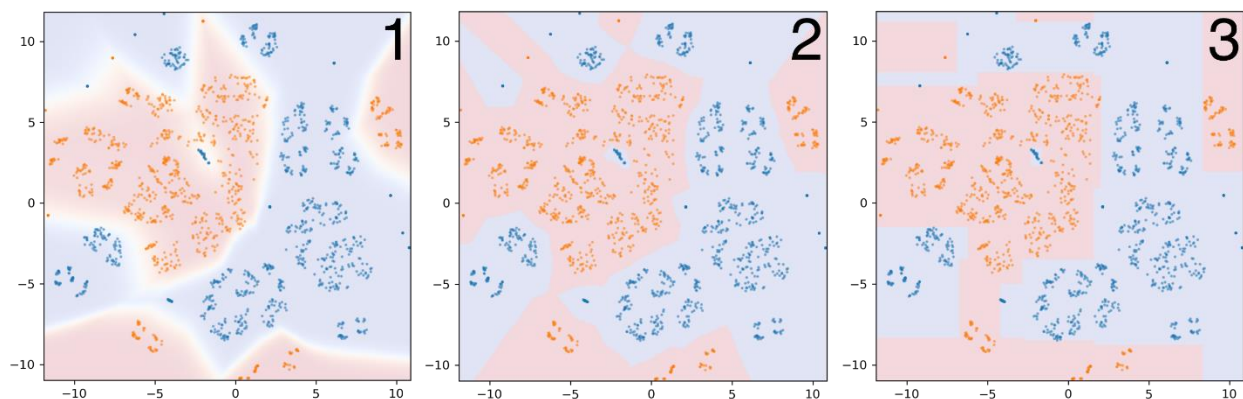
Question 5

Select which of the following statements are true.

- ☐ For a fitted model that doesn't take up a lot of memory, **KNN** would be a better choice than **logistic regression**.
- ☒ For a model that won't overfit a training set, **Naive Bayes** would be a better choice than a **decision tree**.
- ☐ For having an audience interpret the fitted model, a **support vector machine** would be a better choice than a **decision tree**.
- ☒ For predicting future sales of a clothing line, **Linear regression** would be a better choice than a **decision tree regressor**.

Question 6

Match each of the prediction probabilities decision boundaries visualized below with the model that created them.



- ☐ 1. KNN (k=1)
- ☐ 2. Decision Tree
- ☐ 3. Neural Network

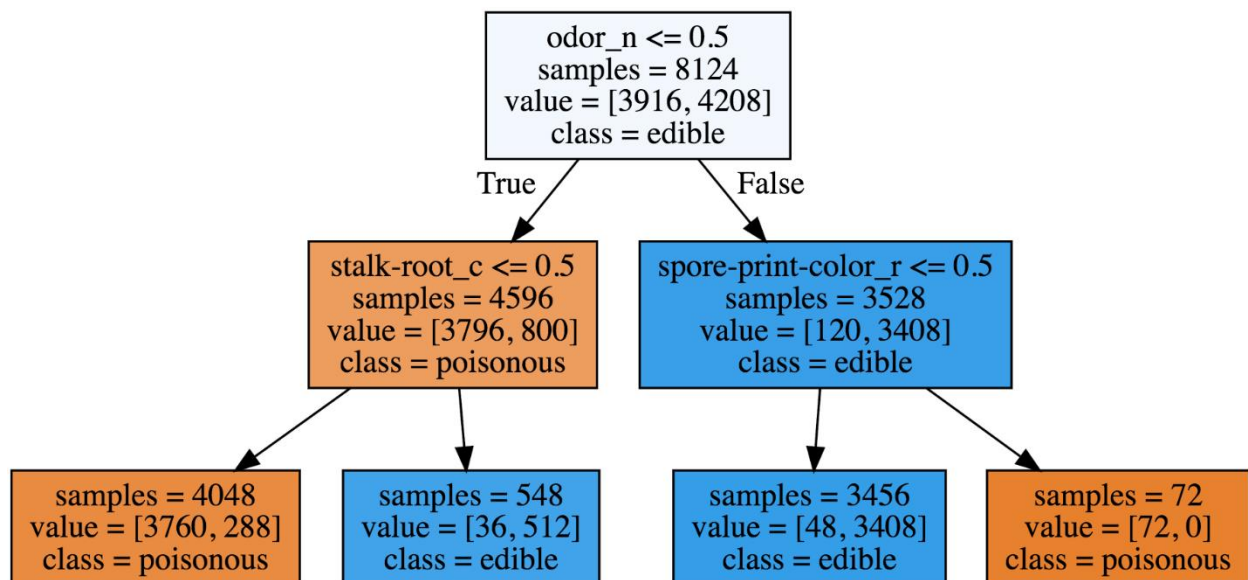
- ☒ 1. Neural Network
- ☒ 2. KNN (k=1)
- ☐ 3. Decision Tree

- ☐ 1. KNN (k=1)
- ☐ 2. Neural Network
- ☐ 3. Decision Tree

- ☐ 1. Neural Network
- ☐ 2. Decision Tree
- ☐ 3. KNN (k=1)

Question 7

A decision tree of depth 2 is visualized below. Using the `value` attribute of each leaf, find the accuracy score for the tree of depth 2 and the accuracy score for a tree of depth 1.



What is the improvement in accuracy between the model of depth 1 and the model of depth 2? (i.e. accuracy2 - accuracy1)

0.06745

Question 8

For the autograded assignment in this module, you will create a classifier to predict whether a given blight ticket will be paid on time (See the module 4 assignment notebook for a more detailed description). Which of the following features should be removed from the training of the model to prevent data leakage? (Select all that apply)

- ☒ compliance_detail - More information on why each ticket was marked compliant or non-compliant
- ☐ agency_name - Agency that issued the ticket
- ☐ graffiti_status - Flag for graffiti violations
- ☒ collection_status - Flag for payments in collections
- ☐ ticket_issued_date - Date and time the ticket was issued

Question 9

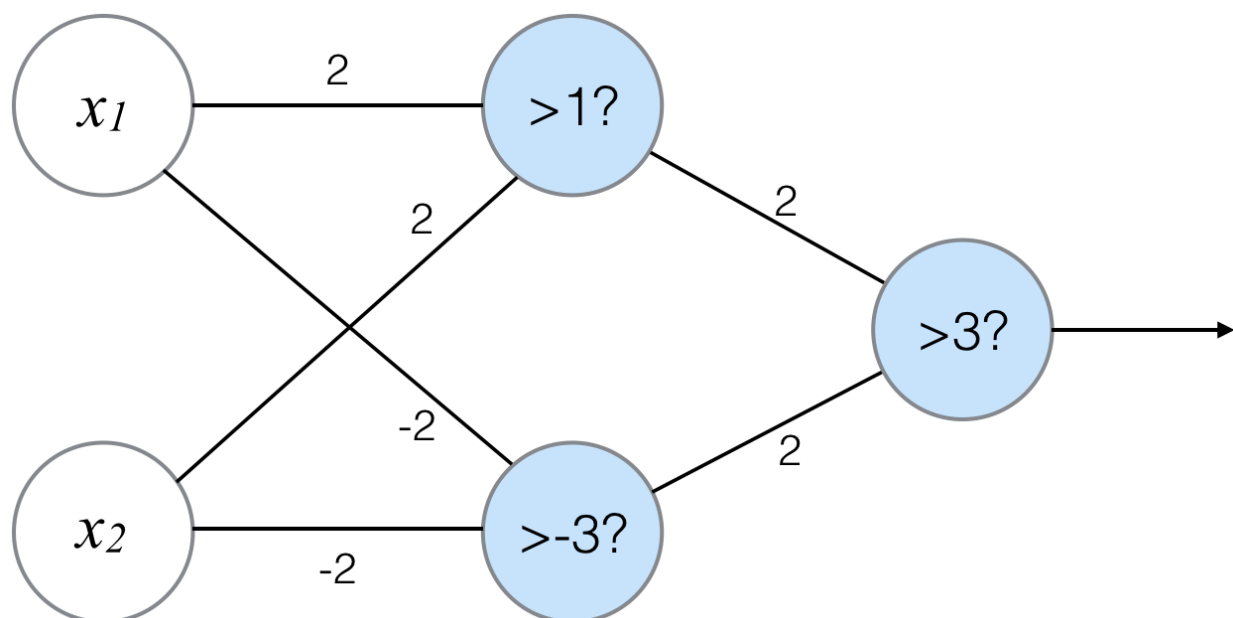
Which of the following might be good ways to help prevent a data leakage situation?

- ☒ If time is a factor, remove any data related to the event of interest that doesn't take place prior to the event.
- ☐ Ensure that data is preprocessed outside of any cross-validation folds.
- ☒ Remove variables that a model in production wouldn't have access to
- ☒ Sanity check the model with an unseen validation set

Question 10

Given the neural network below, find the correct outputs for the given values of x_1 and x_2 .

The neurons that are shaded have an activation threshold, e.g. the neuron with $>1?$ will be activated and output 1 if the input is greater than 1 and will output 0 otherwise.





x1	x2	output
0	0	0
0	1	1
1	0	1
1	1	0



x1	x2	output
0	0	0
0	1	0
1	0	0
1	1	1



x1	x2	output
0	0	0
0	1	1
1	0	1
1	1	1



x1	x2	output
0	0	1
0	1	0
1	0	0
1	1	1