

## Module 4 Quiz

Quiz, 10 questions

1  
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1.

Which of the following is an example of clustering?

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

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2.

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

- ☒ Trees often require less preprocessing of data
  - ☒ Trees are easy to interpret and visualize
  - ☐ Trees are naturally resistant to overfitting
  - ☐ Decision trees can learn complex statistical models using a variety of kernel functions
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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 reduce the computational complexity associated with training each of the trees needed for the random forest.

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To improve generalization by reducing correlation among the trees and making the model more robust to bias.



To learn which features are not strong predictors



To increase interpretability of the model

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4.

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



Decision Trees



KNN



Naive Bayes



Support Vector Machines



Neural Networks

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5.

Select which of the following statements are true.



For predicting future sales of a clothing line, **Linear regression** would be a better choice than a **decision tree regressor**.



For a fitted model that doesn't take up a lot of memory, **KNN** would be a better choice than **logistic regression**.



For having an audience interpret the fitted model, a **support vector machine** would be a better choice than a **decision tree**.



For a model that won't overfit a training set, **Naive Bayes** would be a better choice than a **decision tree**.

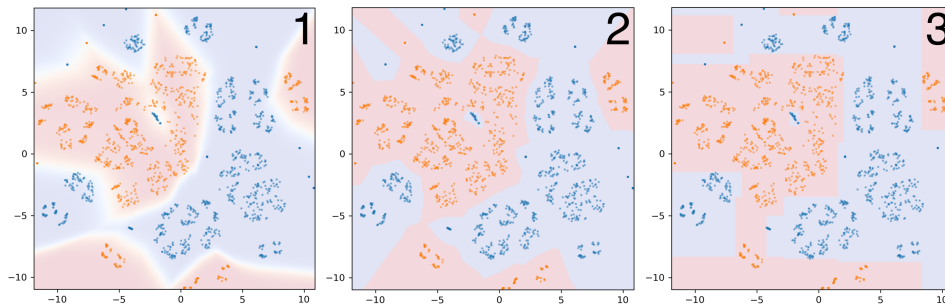
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6.

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



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

- ☐ 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

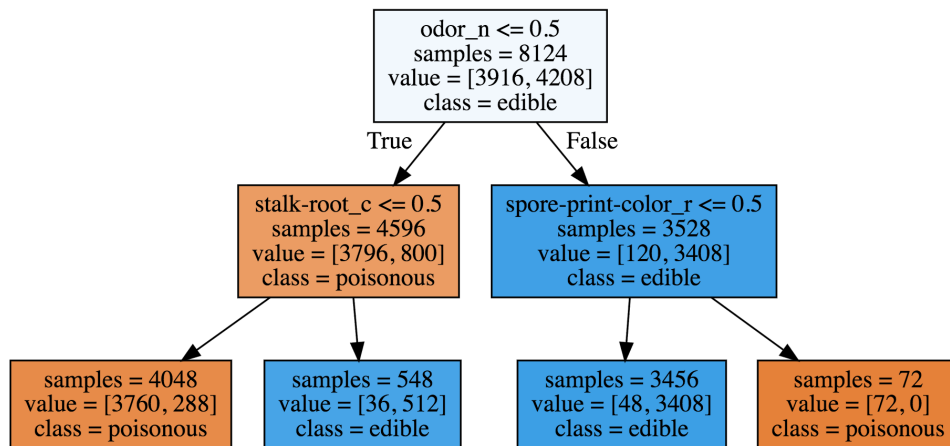
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7.

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.

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

0.067

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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)

- ☒ agency\_name - Agency that issued the ticket
- ☒ ticket\_issued\_date - Date and time the ticket was issued
- ☒ grafitti\_status - Flag for graffiti violations
- ☐ collection\_status - Flag for payments in collections
- ☐ compliance\_detail - More information on why each ticket was marked compliant or non-compliant

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9.

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

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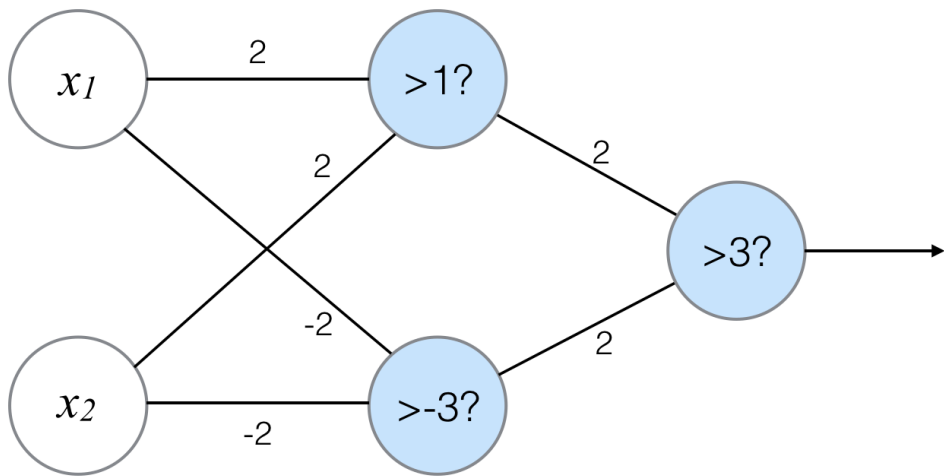
- ☒ If time is a factor, remove any data related to the event of interest that doesn't take place prior to the event.
- ☐ Ensure that data is preprocessed outside of any cross validation folds.
- ☒ Remove variables that a model in production wouldn't have access to
- ☒ Sanity check the model with an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

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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	1
0	1	0
1	0	0

1	1	1
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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



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