Module 4 Quiz

TOTAL POINTS 10

1. Which of the following is an example of clustering? 1 point

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

2. Which of the following are advantages to using decision trees over other models? (Select all that apply) 1 point

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

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? 1 point

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

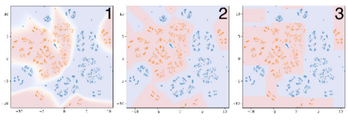
4. Which of the following supervised machine learning methods are greatly affected by feature scaling? (Select all that apply) 1 point

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

5. 1 point

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

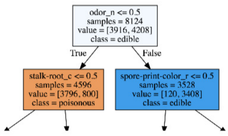
6. Match each of the prediction probabilities decision boundaries visualized below with the model that created them. 1 point



- ○ 1. KNN (k=1)

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

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. 1 point



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

0.0663

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) 1 point

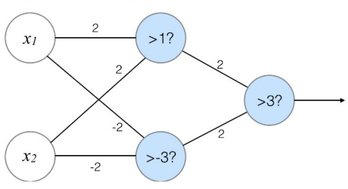
- ☐ agency_name - Agency that issued the ticket
- ☑ collection_status - Flag for payments in collections
- ☑ compliance_detail - More information on why each ticket was marked compliant or non-compliant
- ☐ grafitti_status - Flag for graffiti violations
- ☐ ticket_issued_date - Date and time the ticket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

9. Which of the following might be good ways to help prevent a data leakage situation? 1 point

- ☐ 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

10. Given the neural network below, find the correct outputs for the given values of x1 and x2. 1 point

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

- ○

0	1	1
1	0	1
1	1	1

- ◉

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

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