

Summative assessment

1. What is the difference between a traditional computer program and an ML model?

А.	ML	models	use	rule	-based	IF/	THEN/	statements
----	----	--------	-----	------	--------	-----	-------	------------

B. ML models use a data-driven approach

C. They are the same; the only difference is that ML models use more data

2. Which one of the following applications would most benefit from using an ML model?

A. A login system that checks that the correct password has been entered for a valid user	
B. An online calculator that converts miles to kilometres	
C. A text prediction application that saves you time by predicting the next word you want to use in a sentence	

3. All applications can be used to generate works of art. What data does the model need to be able to generate the art?

A. Vast quantities of example artwork	
B. Human-programmed IF/THEN rules	
C. One image to copy from each known style of art	

4. A popular music streaming service has been designed using machine learning. Which one of the following services would benefit from using a data-driven approach?

A. Recommending a playlist based on the songs you commonly listen to	
B. Adding a song to your favourites when you select the 'thumbs up' icon	
C. Calculating how many minutes of music you listen to during the day	

5. Which type of machine learning involves the use of pre-labelled data?

A. Supervised learning	
B. Unsupervised learning	
C. Reinforcement learning	

6. Which one of the following describes the supervised learning approach to classification?

A. Learning by trial and error	
B. Creating groups from similar items of data	
C. Categorising data by applying labels	

7. The following diagram shows that a piece of data has been labelled as an orange. Which one of the following describes the term 'label'?



A. A category that data can be assigned to	
B. Applied to a single piece of data to indicate which class it belongs to	
C. The confidence score that is returned by the model	

8. Which one of the following describes test data used during the creation of a classification model?

A. Data used to check the accuracy of the model	
B. Data used to train the model	
C. Data entered into an application that uses the model	

9. A machine learning model has been developed to identify birds from sound alone.

Part A: Whilst testing and evaluating the model, developers have found that the model is not able to identify blackbirds. Which **two** of the following actions should the developers take to improve their model?

A. Add more audio samples of all known varieties of birds	
B. Add audio samples of humans and other animals in a variety of environments	
C. Add audio samples of blackbirds in different conditions such as close up or far away	

Part B: Whilst testing and evaluating the model, the developers found the following results. Which **one** of them is an indication of bias in the machine learning model?

A. The app is 96% accurate for blackbirds and 48% accurate for pigeons	
B. The average accuracy across all birds is 68%	
C. The model is unable to identify human speech from sound	

10. Which one of the following methods would help to reduce bias in machine learning models?

A. Using more data from the same data set to train the model	
B. Reordering the data selected from the data set to train the model	
C. Using equal amounts of data from different categories to train the model	

11. Decision trees are made of nodes and conditions. Which two of the following nodes would contain a condition?

A. Leaf nodes	
B. Decision nodes	
C. The root node	

12. Which of the following types of data would be suitable for a decision tree?

A. Numeric	
B. Audio	
C. Image	

13. Two machine learning developers have created decision trees. They have both used the same data set, but one has used the first half of the data set and the other has used the second half.

Which of the following would you expect to see when comparing the decision trees?

A. The decision trees are different	
B. The decision trees are the same	

14. Which two of the following are true about decision tree machine learning models?

A. Choosing accurate splits is impossible by any other method	
B. Machine learning decision trees are always 100% accurate	
C. They are suitable for handling large data sets with many features	
D. They are able to adapt conditions based on new training data	

15. Place the stages of the AI project lifecycle in order.

- A. Evaluating the model
- B. Explaining the model
- C. Preparing the data
- D. Testing the model
- E. Training the model
- F. Defining the problem

Answer:

16. Which one of the following tasks takes place during the data preparation stage of the AI project lifecycle for a classification model?

A. Measuring the accuracy of the model	
B. Creation of the classes	
C. Data cleaning	
D. Producing a model card	

17. A machine learning model is being developed to classify images of recyclable items. The results of the testing are below:

Correctly labelled data? (Yes/No)	Confidence score
Yes	81%
Yes	67%
No	16%
Yes	93%
No	30%
Yes	91%
Yes	77%
Yes	90%
No	89%
Yes	70%

Part A: The formula for calculating the accuracy of a model is shown below. Which of the following should replace x?



A. Number of correctly predicted labels	
B. Number of correctly predicted labels where the confidence threshold is met	
C. Number of incorrectly predicted labels	

Part B: If the confidence threshold was 75%, what would be the accuracy of the model? Give your answer as a percentage.

Space for working out:			
Answer:			

18. Which one of the following best describes the purpose of a model card?

A. Helps application developers evaluate whether or not to use a machine learning model in their product	
B. Describes the technical detail for other model developers to use	
C. Hides the strengths and weaknesses of the model to avoid worrying the users	

19. Which two of the following pieces of information would be included on a model card?

A. What the accuracy of the model is	
B. What the known bias in the model is	
C. What the amount of time spent training the model was	
D. What the technical skills needed to implement the model are	

Summative assessment - Answers

1. What is the difference between a traditional computer program and an ML model?

A. ML models use rule-based IF/THEN statements	
B. ML models use a data-driven approach	\checkmark
C. They are the same; the only difference is that ML models use more data	

2. Which one of the following applications would most benefit from using an ML model?

A. A login system that checks that the correct password has been entered for a valid user	
B. An online calculator that converts miles to kilometres	
C. A text prediction application that saves you time by predicting the next word you want to use in a sentence	

3. All applications can be used to generate works of art. What data does the model need to be able to generate the art?

A. Vast quantities of example artwork	
B. Human-programmed IF/THEN rules	
C. One image to copy from each known style of art	

4. A popular music streaming service has been designed using machine learning. Which one of the following services would benefit from using a data-driven approach?

A. Recommending a playlist based on the songs you commonly listen to	\checkmark
B. Adding a song to your favourites when you select the 'thumbs up' icon	
C. Calculating how many minutes of music you listen to during the day	

5. Which type of machine learning involves the use of pre-labelled data?

A. Supervised learning	\checkmark
B. Unsupervised learning	
C. Reinforcement learning	

6. Which one of the following describes the supervised learning approach to classification?

A. Learning by trial and error	
B. Creating groups from similar items of data	
C. Categorising data by applying labels	\checkmark

7. The following diagram shows that a piece of data has been labelled as an orange. Which one of the following describes the term 'label'?



A. A category that data can be assigned to	
B. Applied to a single piece of data to indicate which class it belongs to	\checkmark
C. The confidence score that is returned by the model	

8. Which one of the following describes test data used during the creation of a classification model?

A. Data used to check the accuracy of the model	\checkmark
B. Data used to train the model	
C. Data entered into an application that uses the model	

9. A machine learning model has been developed to identify birds from sound alone.

Part A: Whilst testing and evaluating the model, developers have found that the model is not able to identify blackbirds. Which **two** of the following actions should the developers take to improve their model?

A. Add more audio samples of all known varieties of birds	\checkmark
B. Add audio samples of humans and other animals in a variety of environments	
C. Add audio samples of blackbirds in different conditions such as close up or far away	V

Part B: Whilst testing and evaluating the model, the developers found the following results. Which **one** of them is an indication of bias in the machine learning model?

A. The app is 96% accurate for blackbirds and 48% accurate for pigeons	\checkmark
B. The average accuracy across all birds is 68%	
C. The model is unable to identify human speech from sound	

10. Which one of the following methods would help to reduce bias in machine learning models?

A. Using more data from the same data set to train the model	
B. Reordering the data selected from the data set to train the model	
C. Using equal amounts of data from different categories to train the model	\checkmark

11. Decision trees are made of nodes and conditions. Which two of the following nodes would contain a condition?

A. Leaf nodes	
B. Decision nodes	\checkmark
C. The root node	\checkmark

12. Which of the following types of data would be suitable for a decision tree?

A. Numeric	\checkmark
B. Audio	
C. Image	

13. Two machine learning developers have created decision trees. They have both used the same data set, but one has used the first half of the data set and the other has used the second half.

Which of the following would you expect to see when comparing the decision trees?

A. The decision trees are different	\checkmark
B. The decision trees are the same	

14. Which two of the following are true about decision tree machine learning models?

A. Choosing accurate splits is impossible by any other method	
B. Machine learning decision trees are always 100% accurate	
C. They are suitable for handling large data sets with many features	\checkmark
	A

15. Place the stages of the AI project lifecycle in order.

- A. Evaluating the model
- B. Explaining the model
- C. Preparing the data
- D. Testing the model
- E. Training the model
- F. Defining the problem



16. Which one of the following tasks takes place during the data preparation stage of the AI project lifecycle for a classification model?

A. Measuring the accuracy of the model	
B. Creation of the classes	
C. Data cleaning	\checkmark

17. A machine learning model is being developed to classify images of recyclable items. The results of the testing are below:

Correctly labelled data? (Yes/No)	Confidence score
Yes	81%
Yes	67%
No	16%
Yes	93%
No	30%
Yes	91%
Yes	77%
Yes	90%
No	89%
Yes	70%

Part A: The formula for calculating the accuracy of a model is shown below. Which of the following should replace x?



A. Number of correctly predicted labels	
B. Number of correctly predicted labels where the confidence threshold is met	V
C. Number of incorrectly predicted labels	

Part B: If the confidence threshold was 75%, what would be the accuracy of the model? Give your answer as a percentage.

Space for working out:	
Answer:	50%

18. Which one of the following best describes the purpose of a model card?

A. Helps application developers evaluate whether or not to use a machine learning model in their product	V
B. Describes the technical detail for other model developers to use	
C. Hides the strengths and weaknesses of the model to avoid worrying the users	

19. Which two of the following pieces of information would be included on a model card?

A. What the accuracy of the model is	
B. What the known bias in the model is	\checkmark
C. What the amount of time spent training the model was	
D. What the technical skills needed to implement the model are	



This resource is licensed by the <u>Raspberry Pi Foundation</u> under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International Public License (CC BY-NC-ND 4.0). For more information on this licence, see <u>creativecommons.org/licenses/bu-nc-nd/4.0</u>.