Day 4 Quiz

3.07.2024

Part A

Pick the correct answer for each question. There is only one correct answer for each question.

Q1. Which of the following statements about classical approaches and machine learning approaches to AI is correct?

(A) The classical approach to AI came first and the machine learning approach came second but both are used equally today.

(B) The classical approach requires the user to specifically define the rules, whereas the machine learning approach allows the algorithm to determine the rules.

(C) The classical approach is a rule-free approach, whereas the machine learning approach allows the machine to determine rules.

Q2. What is the Turing test and what one of the limitations of the method?

(A) The Turing test is a test to see whether you can identify whether some output is human or AI. The test assumes that imitation is a good measure of intelligence, which is a narrow definition.

(B) The Turing test explores whether an AI can convince a human that it is human. The test assumes that imitation is a good measure of intelligence, which is a narrow definition.

(C) The Turing test is a test to see whether you can identify whether some output is human or AI. The test assumes that the AI is multimodal, which is not necessarily the case.

Q3. What are two main types of machine learning and how are they different?

(A) Supervised and unsupervised learning. Unsupervised learning is learning from data without labels e.g. clustering and dimensionality reduction. Supervised learning involves learning a function to map inputs to outputs (predicted targets).

(B) Supervised and unsupervised learning. Unsupervised learning is clustering. Supervised learning is prediction.

(C) Supervised and unsupervised learning. Unsupervised learning is where we don't give the machine any help, supervised learning gives the machine help.

Q4. What does the following notation mean? $x_8^{(9)}$

(A) The value of feature 9 for the 8^{th} individual.

(B) The value of feature 8 for the 9^{th} individual.

(C) The vector of value for feature 9.

Q5. What is a limitation of the k-means algorithm?

(A) The algorithm might run forever and never finish.

(B) When you scale it to many features it can be a time consuming model to run.

(C) It heavily depends upon the random initialisation. Different initialisation can lead to different final clusters.

Q6. What are the two reasons we might want to do dimensionality reduction?

(A) Drop specific features because they are not meaningful and reduce storage costs.

(B) Visualisations (graphs) and reduce storage costs.

(C) Make tables easier to read and reduce storage costs.

Q7. What are parameters in supervised models?

(A) Parameters are the numbers inside the model which determine how the inputs map to predictions.

(B) Parameters are the numbers inside the model which are determined by the human user.

(C) Parameters are the numbers inside the model which determine the true value of the target.

Part B

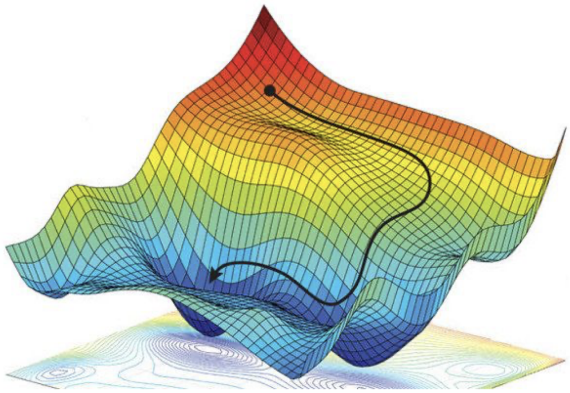
Q8. How does the k-means algorithm work? Explain in as much detail as possible.

Q9. What is the difference between regression problems and classification problems?

Q10*. What is the notation for the predictions of a supervised model? What do we want to compare to evaluate model performance?

Q11*. Roughly, explain how incorrect model predictions lead to learning over time.

Q12.** What does the image below represent? What are potential problems with this approach?



***** Hard question