Multiple Choice Questions for Lecture 5: Learning and Classification

Learning in AI

1. What does "learning" in artificial intelligence mean?

   - A) Computers reading textbooks
   - B) AI systems acquiring knowledge from data or experience
   - C) Programmers writing code for the AI
   - D) AI watching educational videos

   Answer: B) AI systems acquiring knowledge from data or experience

2. What is the difference between a machine learning algorithm and a machine learning model?

   - A) They are the same thing
   - B) The algorithm is the method for learning; the model is the result after learning.
   - C) The algorithm is created by humans; the model is created by computers.
   - D) The algorithm is for simple tasks; the model is for complex tasks

   Answer: B) The algorithm is the method for learning; the model is the result after learning

3. Using the cooking analogy from the lecture, what would the "data" represent?

   - A) The cook
   - B) The recipe (instructions)
   - C) The raw ingredients
   - D) The kitchen

   Answer: C) The raw ingredients

Types of Learning

4. In supervised learning, what is provided to the AI during training?

   – A) Only input data
   – B) Only output data
   – C) Both input data and correct output (labels)
   – D) No data at all

   Answer: C) Both input data and correct output (labels)

5. What type of learning is used when an AI learns to play a game by receiving points for winning?

   – A) Supervised learning
   – B) Unsupervised learning
   – C) Reinforcement learning
   – D) Semi-supervised learning

   Answer: C) Reinforcement learning

6. Which type of learning would be best for grouping customers into different categories without knowing the categories in advance?

   – A) Supervised learning
   – B) Unsupervised learning
   – C) Reinforcement learning
   – D) Structured learning

   Answer: B) Unsupervised learning

7. What is semi-supervised learning?

   - A) Learning that happens halfway through training
   - B) Learning that uses a small amount of labeled data and a large amount of unlabeled data
   - C) Learning that is partly done by humans and partly by machines
   - D) Learning that only works half the time

   Answer: B) Learning that uses a small amount of labeled data and a large amount of unlabeled data

Learning an Unknown Function

8. What is the main goal when learning an unknown function in machine learning?

   - A) To create a perfect copy of the function
   - B) To discover a function that approximates the true function
   - C) To discover the mathematical formula of the function
   - D) To replace the function with a better one

   Answer: B) To discover a function that approximates the true function

9. What is the "ground truth" in machine learning?

   - A) The actual correct outputs in the training data
   - B) The earth beneath the computer
   - C) The foundation of computer science
   - D) The physical hardware the AI runs on

   Answer: A) The actual correct outputs in the training data

10. Why do we split data into training and test sets?

- A) To make the learning process faster
- B) To save memory space
- C) To evaluate how well the model works on unseen data
- D) Because we have too much data

Answer: C) To evaluate how well the model works on unseen data

Types of Prediction Problems

11. What is the main difference between classification and regression problems?

- A) Classification is easier; regression is harder
- B) Classification predicts categories; regression predicts numerical values
- C) Classification uses neural networks; regression uses decision trees
- D) Classification is supervised; regression is unsupervised

Answer: B) Classification predicts categories; regression predicts numerical values

12. Which of these is an example of a classification problem?

- A) Predicting the price of a house
- B) Estimating a person's age
- C) Determining if an email is spam or not
- D) Forecasting the temperature tomorrow

Answer: C) Determining if an email is spam or not

13. Which of these is an example of a regression problem?

- A) Identifying if a picture contains a cat
- B) Predicting the temperature tomorrow
- C) Determining if a customer will buy a product
- D) Recognizing handwritten digits

Answer: B) Predicting the temperature tomorrow

Classification Process

14. What are the two main steps in the classification process?

- A) Data collection and data processing
- B) Model construction and model usage
- C) Training and validation
- D) Input and output

Answer: B) Model construction and model usage

15. How is the accuracy of a classification model typically measured?

- A) By the speed of classification
- B) By the percentage of correct predictions
- C) By the size of the model
- D) By the number of features used

Answer: B) By the percentage of correct predictions

Decision Trees

16. What is a decision tree?

    – A) A diagram showing the hierarchy in a company
    – B) A diagram representing possible solutions to a decision
    – C) A special type of neural network
    – D) A tree that decides which data to use

    Answer: B) A diagram representing possible solutions to a decision

17. Why are decision trees popular in machine learning?

    – A) They are very fast
    – B) They are easy to understand and interpret
    – C) They always give the best results
    – D) They use very little memory

    Answer: B) They are easy to understand and interpret

18. In a decision tree, what happens at each non-leaf node?

    – A) The data is stored
    – B) A prediction is made
    – C) A yes/no question is asked
    – D) The learning rate is adjusted

    Answer: C) A yes/no question is asked

19. What is the goal when learning a decision tree?

- A) To make the tree as deep as possible
- B) To find a tree with small error on the training data
- C) To use as few features as possible
- D) To have exactly the same number of examples in each leaf

Answer: B) To find a tree with small error on the training data

20. What does “purity” mean in the context of decision tree nodes?

- A) Nodes containing examples of only one class
- B) Nodes with no missing values
- C) Nodes that are easy to understand
- D) Nodes that use simple questions

Answer: A) Nodes containing examples of only one class