Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1. Which of the following are true? 1 point
   - If a linear separable decision boundary exists for a classification problem, the perceptron model is capable of finding it.
   - The backpropagation algorithm updates the parameters using gradient descent rules.
   - Training a neural network for binary classification tasks, an ideal choice for the initialization of parameters should be large random numbers so that the gradient is higher.

   No, the answer is incorrect. Score: 0.

   Accepted Answers:
   - 1st option: True
   - 2nd option: True
   - 3rd option: True

2. For training a binary classification model with m independent variables, you choose to use neural networks. You apply one hidden layer with h neurons. What is the number of parameters to be estimated? Consider No bias term as a parameter. 2 points
   - $h^2 + h + 1$
   - $2h^2 + h + 1$
   - $h^2 + h + 2$
   - $2h^2 + h$
   - None of these

   No, the answer is incorrect. Score: 0.

   Accepted Answers: None of these.

5. Consider the following function: 1 point
   $$f(x) = \frac{e^x}{1 + e^x}$$
   The derivative $f'(x)$ will be:
   - $e^x / (1 + e^x)^2$
   - $(e^x - 1) / (1 + e^x)^2$
   - $e^x / (1 + e^x)$
   - $e^x / (1 + e^x)^2$
   - None of these

   No, the answer is incorrect. Score: 0.

   Accepted Answers: None of these.

6. Suppose the marks obtained by randomly sampled students follow a normal distribution with unknown μ. A random sample of 5 marks are 30, 55, 60, 27, and 18. Using the given sample, find the maximum likelihood estimate for the mean. 1 point
   - 36
   - 25
   - 50
   - Information not sufficient for estimation

   No, the answer is incorrect. Score: 0.

   Accepted Answers: None of these.

5. Some points are sampled from a probability distribution following the given probability distribution function $f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$, where μ and σ are known. The collected points are 12, 13, 14, 15, and 16. Give the maximum likelihood estimate for μ. 2 points
   - 14.5
   - 12.6
   - 14
   - 15
   - None of these

   No, the answer is incorrect. Score: 0.

   Accepted Answers: None of these.

6. We have a function $f(x, y) = \sin(x) + y$ which has two parameters $x$ and $y$ given by $f(x, y) = \sin(x) + y$ and the two parameters $x$ and $y$ given by $f(x, y) = \sin(x) + y$. Use backpropagation to estimate the right parameter values. 1 point
   - Assume that we are given a training point $x = 5, y = 1$. Use this information and the next two questions. What is the value of $\frac{df}{dx}$? 0.096
   - 0.965
   - 0.143
   - 0.361

   No, the answer is incorrect. Score: 0.

   Accepted Answers: 0.096.

7. In the previous question, if the learning rate is 0.5, what will be the value of $y$ after one step using backpropagation algorithm? 0 points
   - 0.42533
   - 0.6667
   - 1.62
   - 0.361

   No, the answer is incorrect. Score: 0.

   Accepted Answers: None of these.

5. Which of the following is NOT a valid conjugate pair? 1 point
   - Gradient - Gradient
   - Bias - Bias
   - Biases - Derivative
   - Derivative - Derivative

   No, the answer is incorrect. Score: 0.

   Accepted Answers: Biases - Derivative.