CSPB 4622 - Truong - Machine Learning

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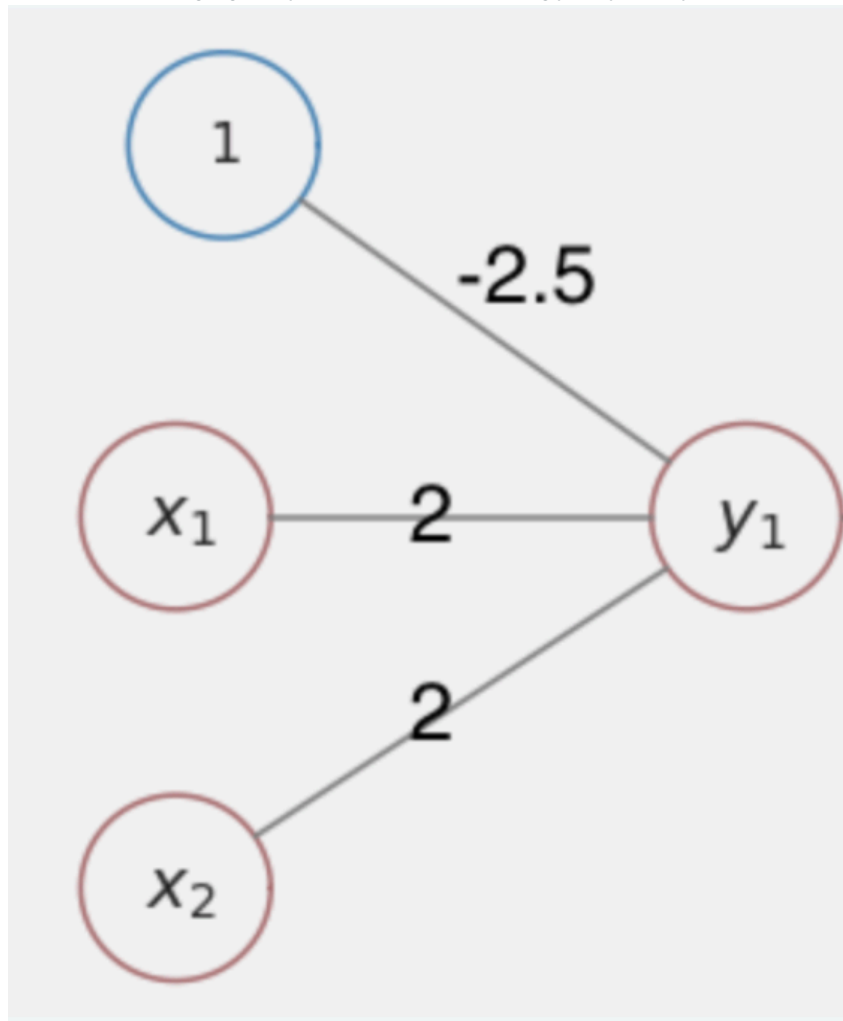|	
Started on	Thursday, 7 November 2024, 11:45 PM
State	Finished
Completed on	Thursday, 7 November 2024, 11:47 PM
Time taken	1 min 39 secs
Marks	6.00/6.00
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Which of the following logical operations does the following perceptron represent? Note that x_1 and x_2 are binary.

- ○ a. x_1 NAND x_2
- ○ b. x_1 XOR x_2
- ⦿ c. x_1 AND x_2 ✔
- ○ d. x_1 OR x_2

Your answer is correct. The correct answer is x_1 AND x_2. Consider Logical AND. Logical AND outputs 1 only when both inputs x_1 and x_2 are 1. For every other case, AND should output 0. The weights are the same for both inputs x_1 and x_2. w * x + b is negative except for when both x_1 and x_2 are 1.

The correct answer is: \(x_1\) \(\texttt{AND}\) \(x_2\)

Question **2**

Correct

Mark 1.00 out of 1.00

True or False: The following training set can be classified exactly by a single perceptron.

x_1	0	1	0	1
x_2	0	0	1	1
y	0	0	1	1

○ a. True ✔

○ b. False

Your answer is correct. A single perceptron is a linear classifier. A linear classifier can properly separate these data points.

The correct answer is: True

Question **3**

Correct

Mark 1.00 out of 1.00

True or False: The following training set can be classified exactly by a single perceptron.

x_1	0	1	0	1
x_2	0	0	1	1
y	0	1	1	0

○ a. True

○ b. False ✔

Your answer is correct. The training set cannot be classified exactly by a single perceptron. A single perceptron is a linear classifier. A linear classifier cannot properly classify XOR.

The correct answer is: False

Question **4**

Correct

Mark 1.00 out of 1.00

Which of the following can be guaranteed to behave as Activation functions and are not difficult to train? Select one or more:

☑
a. Tanh
✔

☐
b. sine

☑
c. Sigmoid
✔

☐
d. cosine

☑
e. Step function
✔

☑
f. ReLu
✔

Step function is guaranteed to behave as an Activation function and is not difficult to train.

The correct answers are: Sigmoid, Tanh, ReLu, Step function

Question **5**

Correct

Mark 1.00 out of 1.00

Consider your model is being trained using the Perceptron algorithm. Let W be the current Weight and x be a misclassified instance. Which of the following statements are valid?

☐
aIf *x* is a positive instance classified as negative, then *W = W - x*

☑
bIf x is a positive instance classified as negative, then *W = W + x*
✔

☑
cIf *x* is a negative instance classified as positive, then *W = W - x*
✔

☐
dIf *x* is a negative instance classified as positive, then *W = W + x*

> Your answer is correct. If x is a negative instance misclassified as positive, then adjust the weight with *W = W - x*.
>
> The correct answers are: If x is a positive instance classified as negative, then *W = W + x*, If *x* is a negative instance classified as positive, then *W = W - x*

Question **6**

Correct

Mark 1.00 out of 1.00

What are the possible **hyperparameters** that can be tuned for a Multi-Layered Perceptron (MLP)? Select one or more:

☑
aActivation functions
✔

☐
bWeights

☑
cNumber of hidden layers
✔

☑
dNumber of nodes in a layer
✔

> Activation functions are a hyperparameter that can be tuned for MLP.
>
> The correct answers are: Number of hidden layers, Number of nodes in a layer, Activation functions