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* **Basic Image Classification**

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**1.**

Question 1

Each pixel value in the MNIST data set can range between 0 to 255. How did we normalize these pixel values before feeding into the neural network model? Assuming the following:

1. X = Image Examples
2. Y = Labels
3. M = Mean of X
4. S = Standard Deviation of X

What would be normalized X?

1 / 1 point



X / 255



(X - S) / M



(X - M) / S

Correct

This is correct! We also used a small epsilon value for numeric stability but that can be ignored.

**2.**

Question 2

Before we fed labels from the data set to our neural network, we one-hot-encoded them. What would be a one-hot-encoded representation of a label value 6 from the MNIST data set?

1 / 1 point



[0, 0, 0, 0, 0, 0, 1, 0, 0, 0]



[0, 0, 0, 0, 0, 1, 0, 0, 0, 0]



[1, 1, 1, 1, 1, 1, 0, 1, 1, 1]

Correct

This is correct! This is how our encoded representations looked like in Task 3 of the project.

**3.**

Question 3

If we have a neural network with just 2 layers - input and output. The input layer has 10 nodes and the output layer has 2 nodes and both are densely connected. How many total learn-able parameters exist in this network architecture assuming we are using biases along with weights?

1 / 1 point

22

Correct

The 2 nodes from output are connected with each of the 10 input nodes. This means a total of 20 connections and 20 associated weights. There will be 1 bias connected to both the output nodes as well giving us a total 22 learn-able parameters.

**4.**

Question 4

In our example, which statement(s) would apply to the **softmax** activation function?

1 / 1 point



Gave us linear output for input values higher than 0 and for input values less than 0, the output is set to 0.



It can be used as an activation function for the output layer in classification problems.

Correct

Correct! Since this activation function gives us probability scores for all the classes, it is suitable to be used as an output activation function for classification problems.



It gives us probability scores for the classes.

Correct

Correct, the **softmax** activation gives us probability scores for all the classes which sum up to a total of 1. The class with the highest probability score is then used as our final prediction.

**5.**

Question 5

If you trained an instance of the neural network model that we created in this project again - with the same training set, same settings and for same number of epochs, would you get exactly the same accuracy and same predictions on the test set?

1 / 1 point



Yes



No

Correct

Correct! The result will be similar but not exactly the same.

**6.**

Question 6

Consider the multi-variate linear equation:

y = w1 \* x1 + w2 \* x2 + b

If we represent this equation in a vector form:

y = W.X + b

where X is [x1, x2] and the dot (.) represents matrix dot product.

What is the *transpose* of W?

1 / 1 point



[w1, w2]



[w2, w1]

Correct

Correct! If this is the transpose of W, the dot product of W and X will give us w1 \* x1 + w2 \* x2.

**7.**

Question 7

Assume that you have a data set of gray-scale image examples. Each example has 100 rows and 100 columns and there are a total of 5000 such examples. You want to unroll these examples into vectors before feeding them into a neural network model. What should be the dimension of the input of your first neural network layer? Just enter the number only:

1 / 1 point

10000

Correct

Correct! Unrolling simply means we are reshaping the 100 x 100 array to a 10,000 dimension vector by stacking all the columns of all the rows one after the other.

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