lesson 3 Questionnaire answers

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1. **What letters are often used to signify the independent and dependent variables?**
   Answer: x is used to signify the independent variable and y is used to signify the dependent variable

2. **What's the difference between the crop, pad, and squish resize approaches? When might you choose one over the others?**
   Answer: answered in the last questionnaire also but
   crop is like cropping / cutting the whole part of image , pad is adding zero to the sides of image , squish : squishing the whole image

3. **What is data augmentation? Why is it needed?**
   Answer:data augmentation is to normalize the data and in turn it may help our model to get better data

4. **What is the difference between `item_tfms` and `batch_tfms`?**
   Answer:it's also answered in previous questionnaire items tf is performed on single item and it happens on CPU while the batch is performed on the whole batch of the data (images) and it's perfomed with GPU (fast)

5. **What is a confusion matrix?**
   Answer:confusion matrix is the measure of how our model is performing over all the data (is it biased how It's predicting classes as right or wrong etc)

6. **What does `export` save?**
   Answer: export saves model in pkl file format but we have to define functions which we've defined previously

7. **What is it called when we use a model for getting predictions, instead of training?**
   Answer: predicting phase : in this phase we get the load the model or to be precise it's the trianed model and we are getting the predictoins what does the model think about our data actually is

8. **What are IPython widgets?**
   Answer:ipython widgets are the widgets by which we can deploy applications , make some GUIs for the model

9. **When might you want to use CPU for deployment? When might GPU be better?**
   Answer:because when we are deploying on the web the CPU is more suitable and it's not costly but if we are looking for GPU it's costly reason 2 is since we are doing the predictions on the single item so using CPU makes sense cause if the client machine doesn't have GPU then we have to connect it to server transfer data from there to there and make prediction on some batch /

maybe single image and get data back it doesn't worth it cause GPU's are made for predicting on the batch of the dataset

1. **What are the downsides of deploying your app to a server, instead of to a client (or edge) device such as a phone or PC?**
   Answer:when we deploy app on the server instead of the client device the data has to be uploaded and then the predictoins are done by server and again sent back to the client this may take some time or the client

2. **What are three examples of problems that could occur when rolling out a bear warning system in practice?**
   Answer:so the the data in the world can be hidden , lower pixel values and much more cases are there maybe the lightning conditions are not as good as we wanted our model to be learn so hidden bear behind the trees can't be identified and it may cause many problems

3. **What is "out-of-domain data"?**
   Answer: the data from the different set of the data or other than the test set data is known as the out of domain data

4. **What is "domain shift"?**
   Answer: when the model gets trained since the data on which the model get's trained gets updated but since the model is trained on the previous dat a it doesn't know about the new data it may cause errors in the program (or predictions will not be the same accuracy as before)

5. **What are the three steps in the deployment process?**
   Answer: you can deploy your model by using either streamlit platform or binder plat form
   Binder platform runs the jupyter notebook where it displays the output in and the ipython widgets of the jupyter notebook but it also shows the markdown widgets there on the binder website takes time to load

   Whearas the streamlit loads quickly but you have to write own stremalit script for deploying the mdoel

6. **How is a grayscale image represented on a computer? How about a color image?**
   Answer: so grayscale image is represented using the 2 pixel color channels which will be there for the image representation in form of the pixel intensity

7. **How are the files and folders in the `MNIST_SAMPLE` dataset structured? Why?**
   Answer:they are in the folder named with the numbers they are associated with they have 10 classes from 0 to 9 and each of the folder having the various written image representation of the mnist dataset

8. **Explain how the "pixel similarity" approach to classifying digits works.**
   Answer: so each number is having different amount of the pixels which are need to be colored so the value of the pixels associated with each image is different we can calculate the value of the intensity and then classify each pixel of image

9. **What is a list comprehension? Create one now that selects odd numbers from a list and doubles them.**
   Answer: list comprehension is the way in python to create the short lists or the functions inside the list
   sample_list= [2*x for x in odd_no_list if x % 2 ==1]

10. **What is a "rank-3 tensor"?**
    Answer: it's the 3 dimensional tensor

11. **What is the difference between tensor rank and shape? How do you get the rank from the shape?**
    Answer:so the rank is the no of shapes , whereas the shape gives the what are the number of values in each dimensions

12. **What are RMSE and L1 norm?**
    Answer: root mean squared error is the rmse : where we are doing (preds-target)**2 .mean().sqrt() L1 norm is sum of the magnitude of the vectors in the space : l1 nrom = abs(target + pred)

13. **How can you apply a calculation on thousands of numbers at once, many thousands of times faster than a Python loop?**
    Answer: np.add if we wanted to add in the c type , or we can use the torch.add(a,b)

14. **Create a 3×3 tensor or array containing the numbers from 1 to 9. Double it. Select the bottom-right four numbers.**
    Answer:
    arr = torch.arange(9)
    reshaped_arr = torch.reshape(arr, (3,3))
    reshaped_arr_doubled = reshaped_arr * 2
    resh = reshped_arr_doubled[1:,1:]

15. **What is broadcasting?**
    Answer: so when the we are doing the multidimensional matrix multiplication with the single number the number get repeated into that number of the dimension it'll be needed for determining the multiplication

16. **Are metrics generally calculated using the training set, or the validation set? Why?**
    Answer:accuracy: measure how the model is performing on the validation dataset after it does perform training on training dataset

17. **What is SGD?**
    Answer: stochastic gradient desnent is the method for optimizing the

function with the sutitable weights parameter

18. **Why does SGD use mini-batches?**
    Answer:for the larger datasets training on the whole dataset will not be possible it'll take much longer to avoid this we take the SGD in mini batches

19. **What are the seven steps in SGD for machine learning?**
    Answer:1. Gathering the data
    Preparing the data
    Defining the model
    Triaining the model on the data
    Evaluation
    Hyperparameter tuning
    Making the predictoins on the trained model

20. **How do we initialize the weights in a model?**
    Answer: we use torch.random() for initializing the weights in the model

21. **What is "loss"?**
    Answer: loss Is the measure how our model is doing on his each step

22. **Why can't we always use a high learning rate?**
    Answer:in the function we have to find the minima which in turn results with the best weights and best predictions if we use higher learning rate then we will not be able to get the minima of the model

23. **What is a "gradient"?**
    Answer: gradient is the deviation or the small amount by which we change the model which in turn helps our model to get updated or be better in the predictions