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L07 Chihuahua or Muffin with CNN Journal

In this lab we used CNN, or convolutional neural networks, to classify images as chihuahuas or muffins. The CNN architecture uses three convolutional layers to learn spatial hierarchies of features from image data. This differs from the neural network we used in the last notebook because that one had only fully connected layers. With convolutional layers, CNN can better learn more complex features from images to improve performance on classification.

While running the model, I noticed that it took a bit longer than the previous one where we only worked with the neural network. This one also seemed to require more code than the previous one. A pattern I noticed was that when I had a higher value for height and width there were more muffin predictions on chihuahuas, and all muffins were predicted to be muffins. When I lowered the height and width value from 64 to 16 only a couple of chihuahuas were predicted to be muffins, but more interestingly, I had a muffin that was predicted to be a chihuahua.

In comparing the CNN with the neural network notebook in the previous lab, I think that the CNN is a better option for image classification tasks because you are able to code it to use spatial hierarchies of features. Looking at the results on this one, I received a prediction and then whether it was actually a chihuahua or muffin, whereas with the neural network one, the results provided a percentage on whether they were either a chihuahua or muffin (for example, 48% chihuahua and 52% muffin). I did notice that running the CNN did take a bit longer than the previous neural network notebook, though. The setting up and importing step in particular took about 3 minutes to complete and the neural network notebook did not have any steps that took longer than a few seconds to completely run.

The main challenge that I came across when doing this lab was at the very beginning. I am not sure if maybe I read it wrong or perhaps even did this completely wrong, but the instructions at the start are the same as in the previous lab. This made me use the same notebook as with the neural lab. I did go through it, but seeing as how it was the same, I was a bit confused. I decided to go back to step one and noticed that there was a notebook with CNN in the name, so I opened that one this time and used it to complete the steps in the instructions. If this was incorrect, then I expect this assignment is not going to go well for me so I am hoping that I did the right thing.

I think that the examples I listed in my previous journal entry about real world applications for using image classification can also be applied with the CNN model. Self-driving cars use it for detecting pedestrians, traffic signs and other cars. Facial recognition and detecting out of place objects are ways that CNN can be used for security and surveillance. Also, as I mentioned before, in the medical field through x-rays or body scans.

Ethical considerations are important when developing and deploying image classification models. One of the things that should be considered is privacy. This goes hand in hand with things like facial recognition. Another thing that should be considered is bias and fairness. We need to make sure that the data that is used for training is diverse to prevent biased results.