Neida Guzman

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L07 Chihuahua or Muffin with CNN

In this lab I looked further into training a model using Convolutional Neural Networks for a chihuahua and a muffin. Starting off with the CNN architecture during the training session, I noticed that it had multiple convolutional layers that transferred which helped the machine learn. This convolutional layer is the filter also known as the kernel layer. This helped process the input of the data with the process grids images are converted into. Comparing the traditional neural network used in the previous workshop the layers were fully connected from neuron to neuron from each layer. In the CNN each layer was its private connection which ultimately ended out with the output based on its findings. The code in NN was a bigger code that included all the data that was inputted and CNN had different cells for each kernel layer. After observing and running the cells in the CNN model, I noticed that the accuracy was higher with a whooping 86% for the final round after modification. Even during the first round it was 83% which compared to the traditional neural network workshop the model accuracy came up to be around 56% which is almost 30% higher. The thing that I found interesting was that for my final round of 86% accuracy the only difference was that the muffins were the ones being miscalculated, but during the first round it was both the muffin and chihuahua. I thought to myself this machine really like thinks these specific four muffins look like chihuahuas and when I looked at them for a second, I too could see the resemblance of course but I still would not confuse them. The accuracy increased by 3 almost 4% after increasing the epoch from 10 to 50 or 100. The more the data looped around the network the more accurate it got but not by much and at some point, it made no difference. Now going back to the traditional neural network model, the performance was of course lower because of the layers it contains. The layers the cell ran through was a multiple layer perceptron which was more suitable for structured data that includes tabular data. Because the neural networks perform better for

structured data, the pictures which involved chihuahuas and muffins did not do well during the first run ups of teaching the machine. This traditional neural network needs to be trained more carefully to reduce the loss and calculate accordingly to the target. The training time for this type also was more intense and detailed because of the type of structure it is made up of to perform and learn like adjusting the weights and biased after each run down. The convolutional neural network includes pooling layers to reduce the number of parameters, spacial size, and computations in the network to produce a more accurate output meaning the training of the machine is less time consuming and effective.

In addition, during my convolutional network workshop I faced a few challenges which included errors like needed to install ‘tqdm’ first before running the cell because it was not previously installed. That was an easy fix because I just had to go back and add one cell before the error cell asking pip to install it. The next one was before I ran the cell, I saw that for the Data transformations section I needed to replace the question marks, the width and height, to successfully run the cell. The last challenge I ran into was like the first problem was installing ‘torchsummary’ and no it was not hard, but it did catch me off guard. I of course installed it in the cell above then ran it but kept saying module error and the problem was the way I spaced the words, instead of asking to install ‘torchsummary’ I asked it to install torch summary and with that second command it told me it was already satisfied. It was a silly mistake and easy to fix. Ultimately, the real-world convolutional neural network model could be used for facial recognition which includes identification and surveillance. This model could be used here because of course it can identify basic objects including a human's face shape and from there it determines essential credentials. This means a more detailed face scan including each person's facial features and other surface

irregularities. Every aspect is calculated gathering a large number of samples to understand what and who it is identifying. It can identify a specific person the force is looking for or just needing to open your phone using the face id. Although this is a fast and effective way of identifying people, it can cause problems because if enough information is not received by this classification model, then the wrong person can be identified. This could result in lawsuits over privacy matters since a computer, if not trained properly, can easily mistake the wrong person. At the end of the day, I do not think the machine is going to be held accountable, or is it?

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Works Cited

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