LEO ANN network PDF

Topology : For my specific one, I use 1 input layer and 1 hidden layer and 1 output layer, basically a single layer hidden layer network. I did it because of the fact that my 2060 super is too weak to do multiple layers computation. So the network looks like 784 neuron in the input layer, then 10 neuron in the hidden layer, and then 10 neuron in the output layer. Originally I planned to do a very deep neural network up to 5 hidden layers, but when I actually started to do it with even tensor flow I found out that my GPU is not equipped to handle the amount of calculations, my RTX 2060 only have 240 tensor core, and it was struggling reaching temp as high as 95C, so I gave up and went with a simple 1 hidden layer topology.

Parameter : For my parameter, I used a learning rate of 0.50, and instead of epoch I used a convergence target in this case 0.92. Every 50 epoch or so the model calculate the accuracy of the weights and bias. If it reaches 92 % then it exit. For activation function I used sigmoid for hidden layer(I don't like calling it logistic) and softmax for output layer. And one hyper parameter which is the amount of layers in the model. In my case I actually timed my model and it used roughly 242 second in the RTX 2060 super gpu with ryzen 5800x cpu. My bias and weight were initalizaed using a uniform distribution with np.random.seed(10041957), if you use just normal np random the time might be shorter or longer. With a testing set accuracy of 92% it did a 90% on the actual validation set.

Output screenshot:
Accuracy 90.75%

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Following is wrong
 Model : [2]
 Actual : [3]
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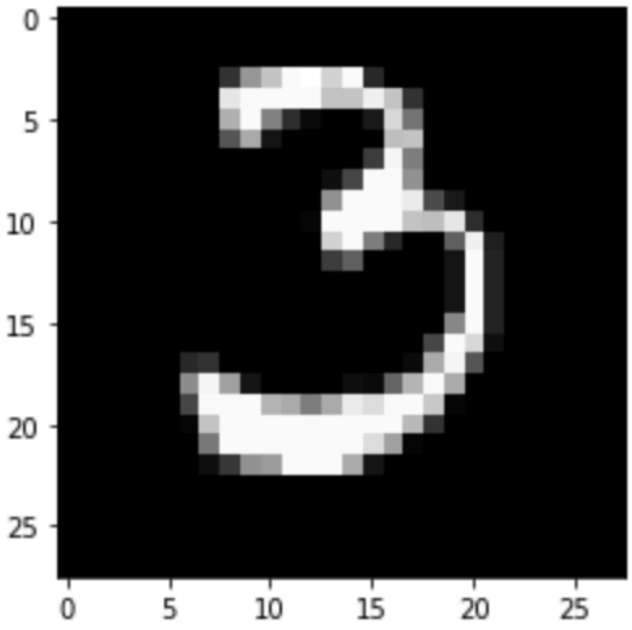
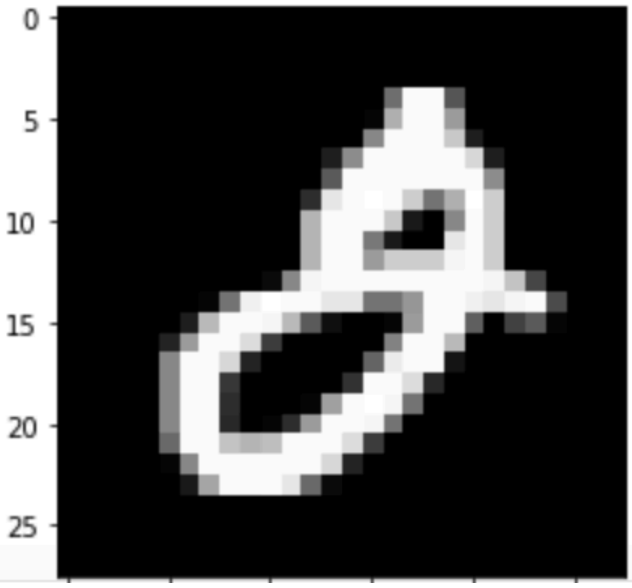



```
Following is wrong
 Model : [3]
 Actual : [2]
```



```
 Model : [5]
 Actual : [0]
Following is wrong at 9893 But ran out of display space
 Model : [8]
 Actual : [4]
Following is wrong at 9895 But ran out of display space
 Model : [5]
 Actual : [3]
Following is wrong at 9907 But ran out of display space
 Model : [3]
 Actual : [7]
Following is wrong at 9913 But ran out of display space
 Model : [7]
 Actual : [9]
Following is wrong at 9915 But ran out of display space
 Model : [9]
 Actual : [4]
Following is wrong at 9926 But ran out of display space
 Model : [9]
 Actual : [3]
Following is wrong at 9948 But ran out of display space
 Model : [3]
 Actual : [2]
Following is wrong at 9961 But ran out of display space
 Model : [4]
 Actual : [2]
Following is wrong at 9987 But ran out of display space
 Model : [8]
 Actual : [0]
Following is wrong at 9996 But ran out of display space
 Model : [4]
 Actual : [9]
Hits : 9075 , Misses : 924
 Model accuracy : 90.75907590759076%
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I had tried the model with RELU activation function for hidden layer and the time is improved by a lot reaching 92% at 150 second. It seems that over fitting is not really a issue here, I have pushed the model up to 95% with relu and the validation set result was actually pushed to 94%.