

HW3 CSC578

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Implementation of neural network

Part 1:

Complete

```
Epoch 0 complete
Epoch 1 complete
```

```
Epoch 0: 50 / 150
Epoch 1: 50 / 150
```

Above were the output we need to verify that we are getting at the end of part one.

In part one we have downloaded the data from given file in the assignment. I also ran all the line from that code which was in Jupyter notebook. I mostly use Jupyter notebook for python, machine learning main thing is because it contains less space on the computer and work as cloud computer which is kind of fun. I have also option to use google co-lab but I don't have much experience with that. However, previously work with AWS and google cloud at my internship. Output for the part one is attached as above.

Where part 1 was comparatively easier than the part two and part three as it does not contain modification of the code or any other addition. So it was not time consuming, Took only 15 to 20 minutes to complete part one and understand thoroughly what it is trying to say.

Part 2:

Complete

2.A - Complete
2.B - Complete
2.C - Complete

Part two is modification which has to be made in the network code. One important change which I need to make is dealing with factors are understand one hot vector representation.

Part two what is the core of the whole assignment if your part two is correct then you can easily move forward to part three which is just testing of the code.

Initially there was three part in part two first part was containing modifying the evaluate function, the second part was to edit SGD function and the third part was to update backdrop function.

In addition, there was totally three parts in this assignment part one containing initial test of application notebook. Where the second part was modification of to NN578 network.py. In part two, we have edited valued function in addition we also computed the

Mean Square Error, correct count, cross entropy, log likelihood and accuracy. For reference I have been through an NNDL3 and NNDL1. I haven't print statement any values in the loop. We have returned all the values in the list.

In part two we we have updated function SGD where I evaluate for training and testing site and also formatted output as per professors direction. In part two I have trained a neural network using the stochastic gradient descent and I also trained and tested data. I am also used function backdrop and before that I have updated SGD for stopping accuracy.

Where in part 2C, I have updated and edited backdrop function with activations function. Also we have changed the network size as per the given direction in the assignment. we have edited backdrop function use local variable activation which was initially allocated to structure and append one layer at a time. We make empty list and then store all the activation in that empty to list.

Part 3 Complete

3.A - Complete
3.B - Complete
3.C - Complete
3.C(A) - Complete
3.C(B) - Complete
3.C(C) - Complete
3.C(D) - Partial

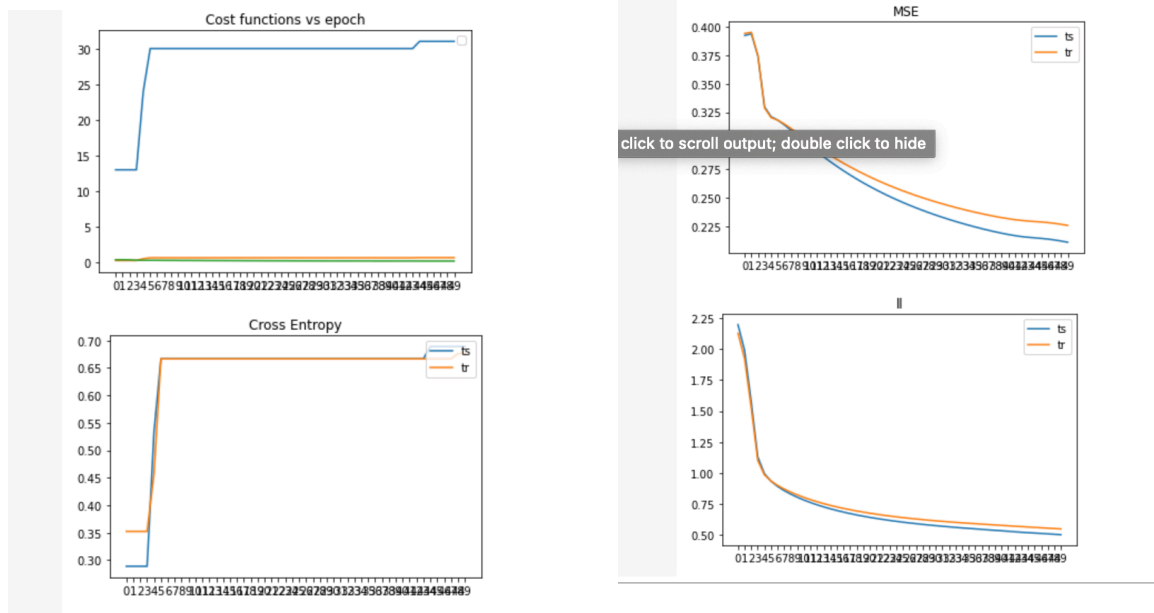
In part three we are testing the application, we edited part two or modified part two now using that same code we are testing our application further. As per professors guidance we have used particular format for the output which you can see in the below image.

Initial testing at the end of part two we have done according to professors guidance. And my output matched with professors output it was HTML file.

Modification of output matched with the result which professor provided in the assignment my results were same and were not speculating that was almost same as professors output. Also tested with deeper network and result matched. In the next page I'm presenting the visualisation and also make a analysis of the graphs.

```
Epoch 0: Training: Correct_Count = 50/150, Accuracy = 0.3333333333333333, MSE = 0.31082997829609715, CrossEntropy = 1.9394780158026892, ll =1.0727033462973705
Epoch 1: Training: Correct_Count = 50/150, Accuracy = 0.3333333333333333, MSE = 0.30895708531130506, CrossEntropy = 1.9891089231965704, ll =1.1365452408104657
Epoch 2: Training: Correct_Count = 50/150, Accuracy = 0.3333333333333333, MSE = 0.3123909597330367, CrossEntropy = 1.9372349255124093, ll =1.1203061335680224
Epoch 96: Training: Correct_Count = 134/150, Accuracy = 0.8933333333333333, MSE = 0.10074578450356629, CrossEntropy = 0.5621925422051643, ll =0.26118019231439044
Epoch 97: Training: Correct_Count = 135/150, Accuracy = 0.9, MSE = 0.0999780876640149, CrossEntropy = 0.5555422060165964, ll =0.2579519316091574
Epoch 98: Training: Correct_Count = 136/150, Accuracy = 0.9066666666666666, MSE = 0.09922035568221416, CrossEntropy = 0.5492451653836661, ll =0.2548905326610812
Epoch 99: Training: Correct_Count = 136/150, Accuracy = 0.9066666666666666, MSE = 0.09847439634770719, CrossEntropy = 0.5431915916579422, ll =0.2519493284932309
```

You can see there are four different graphs here. Each graph indicates different story about the data and about the network here you can see that there are mainly four lines in the graph. Green line blue line and red line, each line indicates different properties of the data just for an example for MSE we use blue line. For cross entropy and log likelihood values we have used respectively red line and green line.



In the graph one you can see blue line is high which indicates MSE is high where other values like log likelihood and cross entropy near zero. Where in second graph we can see on training side and testing set cross entropy is higher and almost similar in the both situation although starting point of the testing set was lower than the training set. Where training started at around 0.35 and testing started at the 0.30.

Where in graph three and four you can see value of training and testing set is lower than the second graph also it is decreasing gradually it started at 0.400 to almost zero.

2.E)

My thoughts on this assignment is there is a great day learning from this assignment and also you need to think out of the box many time and also it was like really brainstorming. I want counted many unexpected problem although all the code were given still it was a hard work to modify and update it. Most challenging part I faced was to apply concepts of neural networks in the code but as it was challenging it was great opportunity to learn also. I'll complete my all the code from yesterday only

But because of some minor error my output were not coming for the graphs but my main motive was to learn from this assignment rather than considering more about greets but I'll appreciate if you understand my situation. Some most difficult part was as I said I was getting some error in the in my graph. In future I would like to use more of tensor flow and can occur as library because I have undertaken course in image processing which was much similar to that.