

Unfinished Homework Submission

Dear IANNwTF 23/24 Team,

despite all my efforts, I have not managed to get the backpropagation running for the MNIST, due to a few aspects about backpropagation I do not understand:

- CCE Backwards: I am unsure whether I have calculated the error signal properly. I thought an error signal was the product of the derivative of the activation function and the derivative of the loss function. I have found the derivative (prediction - target), which apparently combines both softmax derivative and CCE derivative (so exactly what I want), but then I'm not sure how this would result in a matrix of shape (minibatch_size, 1) and not (minibatch_size, 10)
- Sigmoid Backwards: The confusion about the error signal continues here. I am supposed to add the error signal to the derivative of the sigmoid, which I think I implemented correctly, if the error signal from the previous step is correct. However, this is a second activation function that we are applying to the error signal, which does not make sense to me.
Further, why are we taking the pre-activation and activation as input? I thought this step meant passing the activation (output after applying the activation function) back through the derivative of the activation function (in this case sigmoid) to see how the pre-activation (raw output before applying the activation function) affects the loss at the end. But then the pre-activation would be the output only, not the input, no?
- MLP Layer: Here I am not exactly sure how to get the appropriate weight matrix to apply to the activations/outputs of the previous layer but I believe this would clear itself up if I understood the previous steps. Again, I am confused about the error signal passed to this function, but this is also nothing new.
- With my insecurities about the first two steps I did not manage to continue the implementation, as the issues with desired inputs to functions accumulated quite quickly.

My apologies for the lengthy, yet ineffective python file and thank you for your continued support,

Leonard Schrumpf