

CS 4375

ASSIGNMENT Neural Network

Names of students in your group:

Caige Middaugh (Myself)

Number of free late days used: 0

Note: You are allowed a **total** of 4 free late days for the **entire semester**. You can use at most 2 for each assignment. After that, there will be a penalty of 10% for each late day.

Please list clearly all the sources/references that you have used in this assignment.

<https://folk.idi.ntnu.no/keithd/classes/advai/lectures/backprop.pdf>

Report

The results will be pulled from the graphs and output table that is labeled with a _35 at the end of it. It appears that Relu does not do well with higher learning rates regardless of the number of epochs since it has 58% accuracy for every single epoch option at .1 learning rate. Overall, the results are very well with most performing 97% or higher. On top of that some of the R^2 , MSE, and Binary Crossentropy values perform very well on these high accuracy models. That means that it has good potential to taking in completely new data and predicting it correctly since all the metrics and accuracy shows that it's a solid choice. Overall good news is that test and training accuracy for all models were very close to each other, suggesting there was little issues with overfitting or underfitting.

It also appears that MSE offered the best results on average compared to Binary Crossentropy even in the higher epoch levels. It also looks like Binary Crossentropy was prone to overtraining because the R^2 values are 1 for a few of the training models, while for those same models the test R^2 were good but not as high as a 1, most were in the 80%-90% range.

It also appears that 3 layers performed better than 4 layers with this data set, resulting with fewer extreme outliers in the 3-layer networks. However, for both the outliers are because of Binary Crossentropy, which supports my previous claim about MSE being better.