Bryan Faryadi (801178567) - Homework 5

Github: [https://github.com/bfaryadi/ECGR4105\_hw5\_bf](https://github.com/bfaryadi/ECGR4105_hw4_bf)

Problem 1

The final loss for the linear model using Adam optimizer was 2.927648 in the lecture 12 slides.

Nonlinear model final losses:

1.0 learning rate: 2.681390586791368

0.1 learning rate: 2.742812543552537

0.01 learning rate: 5.035563802413372

0.001 learning rate: 4540.802374816841

0.0001 learning rate: 6057403.528961799

I added a training with 1.0 learning rate because I noticed for 0.1 learning rate that the decrease in loss between epochs 4500 and 5000 was still significant, so it would clearly benefit from a greater learning rate. As we can see, 1.0 learning rate did the best, with the final loss becoming greater as the learning rate goes lower. Both 1.0 and 0.1 learning rates resulted in a better performing model than the linear one.

Visualization of the 1.0 learning rate quadratic model against the linear model can be found in the notebook.

Problem 2

The best model was once again the one with the highest learning rate. Comparing these results to the linear regression done in homework 2, my final training and validation losses are roughly an order of magnitude higher. This may be due to the fact that I standardized the data in homework 2, but not in this homework.

Problem 3

As with problems 1 and 2, the best model was the one with the highest learning rate. When including all the variables of housing data, the final training and validation losses were once again roughly an order of magnitude higher than in homework 2. I tried standardizing the data this time, but it resulted in much higher losses than the unstandardized data, so I’m not sure what the cause of this is. There may simply be no patterns in the housing data. Compared to losses from problem 2, these are very slightly lower.