Justin Park
112184933
park1996
CMSC389A

Practical 2 Analysis

Analysis

1. **What were the results of your model? Report any scores or figures you feel necessary to explain your point.**
   My model was able to achieve an accuracy of 81.95% on the testing data. Using a validation set to visualize the training loss overtime confirmed that my model was at peak performance when it reached an accuracy 82.42% on the training data. I found that many of the features were irrelevant by training the model on just the repayment status features. Even by training the model on just these features I was able to achieve the same accuracy as training on all the features.

2. **How did you decide on the best architecture for your model?**
   I decided on the best architecture for my model by "overshooting" the network size. I started with as many hidden layers as 6 with as many neurons as 100. From there, I slowly decreased the number of layers and neurons until I was able to notice a significant difference in the accuracy. I used the minimum observed number of layers and neurons that resulted in the desired accuracy.

3. **How did you choose the parameters for your model (e.g. parameter sweep)?**
   I chose the number of epochs by first starting off with a very large number of epochs (200) and noticing plateaus for the accuracy. Over several runs I noticed that the accuracy levelled off at around 82.5% and I chose a smaller number of epochs (50) that would get the model accuracy sufficiently close to 82.5%. I chose the batch size by starting off with a small batch size (10) and increasing it to see increases in model training speed without seeing decreases in model accuracy. Although I may not be understanding the parameter correctly, I found it counterintuitive that increasing the batch size resulted in faster model training.

4. **Did you notice anything interesting about the model performance or any of the features?**
   As mentioned above in question 3, I found it counterintuitive that increasing the batch size resulted in faster model training. No matter what I tried (increasing epochs, decreasing batch size, including/excluding different features), I was never able to get the model accuracy above 85%. I also noticed that many of the features were irrelevant. Some features such as ID were obviously irrelevant but others were shown to be irrelevant through inspection. The education feature may be irrelevant because it is impossible to distinguish between the effects of 4=others, 5=unknown, and 6=unknown. It is intuitive that the repayment status features were the most important because it seems that there is no better way to determine whether someone will default on their next payment than inspecting their past performance on payments.

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5. **What challenges did you face when completing this task?**
   I found it challenging to determine which model architecture to use. Most resources online said that empirical observation is the best way to determine this so I ended up just basing my architecture on week 5's notebook and using trial and error. I tried different activation functions and architectures but I was not able to discover anything meaningful.