**Deep Learning Challenge**

**Analysis**: The purpose of this analysis was to create a neural model for Alphabet Soup so that Alphabet Soup could select applicants that have the best chance of being successful with their ventures. We used machine learning and neural networks to build this out because Alphabet Soup has a very large dataset, and these tools are very efficient on predicting successes and failures within large datasets.

**Results:**

* **Data Processing:**
  + **What variables are the targets for your model:**
    - IS\_SUCCESSFUL
  + **What variables are the features for your model?**
    - APPLICATION\_TYPE, AFFILIATION, CLASSIFICATION, USE\_CASE, STATUS, INCOME\_AMT, SPECIAL\_CONSIDERATIONS, IS\_SUCCESSFUL
  + **What variables should be removed from the input data because they are neither targets nor features:**
    - EIN, NAME, ASK\_AMT, ORGANIZATION

A screenshot of a computer program

Description automatically generated

* **Compiling, Training, and Evaluating the Model:**
  + **How many neurons, layers, and activation functions did you select for your neural network model and why?**
    - We used 3 neurons, 2 layers and 2 activation functions. I was experimenting with the number of neurons to use; I noticed that when I increased the unit range the accuracy dropped. I didn’t change the activation functions because I couldn’t find one that would have worked better than Relu since I converted my data to 1’s and 0’s, which Relu utilizes. Sigmoid’s must be used for the output layer since it squashes the output to a range of 1.

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* + - **Were you able to achieve the target model performance?**
      * I was close to reaching the 75% accuracy, I got 72%
    - **What steps did you take in your attempts to increase model performance?**
      * I dropped extra columns that we didn’t need because the data seemed irrelevant. I then tried to find bins that balanced the data. I couldn’t find any activation functions that I could have used to replace relu, so instead I decided to try to balance the units so the model wouldn’t have to work as hard.
* **Summary:** Overall, I found that utilizing less data by dropping columns and making smaller bins helped increase my model’s accuracy. I found trying to increase the epochs to be frustrating due to the amount the model took to load and ultimately didn’t change anything. According to Google, logistic regression could be another model that could help with classification, mainly because it is very effective when using binary data.