Neutral Network Model Report

**Purpose**:

Create a binary classifier that can predict whether applicants will be successful if funded by a nonprofit organization called Alphabet Soup.

**Results:**

* Data Processing-
  + The input variables include application type, affiliation, classification, use case, organization, status, income amount, special considerations and ask amount.
  + The output/feature will be the IS\_SUCESSFUL column with 1- successful and 0- not successful.
  + The following variable were removed due to not being a target nor a feature
    - EIN, Status and Special Considerations.
* Compiling, Training and Evaluating the Model:
  + Neurons- 140 (100-Layer1, 30-Layer2 and 10-Layer3)
  + Layers – 4
  + Activation functions- 4
    - 1 ReLU
    - 3 sigmoid
  + The selection of a higher number of neurons and layers allowed for a higher number of parameters to be identified which ultimately increase the accuracy.
  + The target predictive accuracy desired was 75% and the following results were achieved:
    - Step 1 and 2- resulted in 73%
    - Step 3 and 4- resulted in 79%
    - Yest the targeted result was achieved.
  + Steps taken to increase results:
    - Increased the Neuron count from 110 to 140
    - Increased the layers from 3 to 4.
    - Used 1 Relu instead of 2 initially
    - Used 3 sigmoids instead of 1.

**Summary:**

By increasing the overall parameters of the analysis from 5,981 to 42,951, I was able to increase the accuracy from 72.8% to 78.9% which achieved a value greater than the recommended 75%. One other module that could be utilized is the Random Forest Classifier which can provide similar results with a neuron estimator count of 128 and a random state of 78. This also increases the accuracy and provides an model accuracy of 77.2% which is also above the predictive estimate of 75%.