**Deep Learning – Charity Effectiveness Model**

**Overview**: The purpose of this analysis was to create an algorithm for Alphabet Soup to predict the success of their applicants cause with their provided funds.

**Results:** My code resulted in 80% accuracy after optimization

Data Preprocessing

* Target for model = IS\_SUCCESSFULL
* Features for model:
  + NAME—Name of Charity
  + APPLICATION\_TYPE—Alphabet Soup application type
  + AFFILIATION—Affiliated sector of industry
  + CLASSIFICATION—Government organization classification
  + USE\_CASE—Use case for funding
  + ORGANIZATION—Organization type
  + STATUS—Active status
  + INCOME\_AMT—Income classification
  + SPECIAL\_CONSIDERATIONS—Special consideration for application
  + ASK\_AMT—Funding amount requested
* Variables Removed = EIN
* Variables Adjusted for Model Performance:
  + NAME – Binned to compile those that appear less than 6 times into “Other”
  + APPLICATION\_TYPE - Binned to compile those that appear less than 500 into “Other”
  + CLASSIFICATION - Binned to compile those that appear less than 500 into “Other”
  + ASK\_AMT – Removed outliers identified as those asking for $1 Million dollars or more.

Compiling, Training, and Evaluating the Model

* After optimization, I used four hidden layers with decreasing neurons with each for more focus.
* I choose RELU as it is simple and fast. RELU is also used most in the teaching examples.
* Target model performance was achieved 80%
* Steps to increase model performance were as follows:
  + Added Name as a Feature to capture patterns for charities that had multiple rows.
  + Took the outliers out of the Asked amount. Looking at only those below $1M after noticing some were in the billions. My assumption is those were mistakes.
  + I started with two hidden layers and added two more for a total of 4 with added neurons from the original code.

**Summary:** Overall the results of the model were that it performed well in predicting whether a charity would use the money provided to them by Alphabet Soup effectively. I would recommend developing another model that would predict ROI for Alphabet funds. I would investigate the amount asked by Charity and gather more detailed data around the level of effectiveness by quantifying.