**AlphabetSoup Neural Network Model Report**

**Overview:**

The purpose of this analysis was to determine if an algorithm can be created with the given data (on over 34,000 organizations that have received funding from AlphabetSoup) that will predict whether applicants for funding will be successful. This could help AlphabetSoup make more informed decisions around funding approvals.

**Results:**

**Data Processing:**

* Target variable for the model is the “IS\_SUCCESSFUL” field since our goal is to determine which applications are likely to be successful for funding in the future.
* Feature variables for the model are: APPLICATION\_TYPE, AFFILIATON, CLASSIFICATION, USE\_CASE, ORGANIZATION, STATUS, INCOME\_AMT, SPECIAL\_CONSIDERATIONS, and ASK\_AMT.
* Features that are neither targets nor variables, and were removed from the dataset: EIN, and NAME.

**Compiling, Training, and Evaluating the Model:**

* Architecture of the model: 2 hidden layers (hidden nodes 1 = 80, hidden nodes 2=30). You need at least 2 layers for deep learning so I started there to get an idea of how the most basic version would perform. Nodes were picked based on inputs (second layer has about half as many as the first layer).
* Hidden layer activation function is relu. I used this to keep the model simple for the first attempt. Relu is a fairly common activation function.
* The function used on the output layer was sigmoid which provides an output value between 0 and 1 to give the probability for true/false for “IS\_SUCCESSFUL”.
* I was not able to achieve target performance with this fist model. The accuracy score was 0.728 and the goal was 75% accuracy.
* The steps I took to attempt to improve accuracy of the model were:
  + Adding a third hidden layer with 15 nodes. This made that accuracy slightly worse at 0.727.
  + Increasing epochs from 100 to 150. This also did not improve the accuracy and produced 0.727 accuracy as well.

**Summary:**

I was not able to meet the goal of 75% accuracy with my neural network model. The highest accuracy I achieved was 72.8%. Possible alternatives that could be used to create a model with higher accuracy may include testing out different activation functions on the hidden layers. You could also try dropping some additional columns such as “SPECIAL\_CONSIDERATIONS’, this is just a Y/N response so it’s possible that it’s not providing enough detail to really be valuable. If you had the ability to add more information such as regional information could provide more data that might help the model reach a higher accuracy score.