Overview

The nonprofit foundation Alphabet Soup provides funding for organizations, and is looking for help in selecting applicants that will effectively utilize the provided funding towards the organization's ventures. To that end, Alphabet Soup has provided us data concerning a portion of their past investments, and hopes that we will be able to provide to them a machine learning algorithm that can accurately assess whether a new application for funding will be successful or not.

Model-building Process

The target variable for our model is the variable 'IS_SUCCESSFUL', as it is a binary representation of whether Alphabet Soup's provided funding was put to an effective use by the applying organization or not. Of the rest of the data's features, the identification variables such as name and ID's were removed, as their unique identifiers would unnecessarily bloat the data during preprocessing. The remaining variables, including details on the applying organization's classifications and income, details on the application like it's stated use and the amount requested, and the type of application and any special considerations added on - all were processed to become the features that the model would analyze to determine if the funding would be successful or not.

My first iteration of the neural network model was kept simple - taking the 44 features input, passing through an 80-neuron ReLU layer, a 30-neuron ReLU layer, and finally outputting to a single-neuron sigmoid layer to classify the data into the target predictions. This original model worked very well with a 72.65% accuracy performance, but came up short for the requested 75% accuracy. For my optimization testing, I added extra ReLU layers to the model, tweaked the neuron count of each of the ReLU layers, and experimented with increasing and decreasing the epoch count for the model's training. Unfortunately, I could not get much higher of an accuracy score than the first iteration through my testing.

Summary

Overall, all compiled versions of the tested neural network model have a decent rating for accuracy, but all fall short of the proposed 75% minimum accuracy. However, I would still recommend TensorFlow Sequential neural networks as the Alphabet Soup charity's choice for determining its loan successes, as they are the most applicable to the outlined task and can still be further optimized and refined.