Deep-Learning Challenge Report

Overview of the analysis:
The Alphabet Soup foundation wants to create an algorithm to predict whether or not applicants for funding will be successful. Using machine learning and neural networks, the features provided in the dataset must be used to create a binary classifier that is capable of predicting whether applicants will be successful if they receive funding from Alphabet Soup.

Results:

- Data Preprocessing

  The target variable of my model is IS_SUCCESSFUL and has the value of 1 for yes ad 0 for no. The feature variables of my model are Application type, Affiliation, Classification, use case, organization, status, income amt, and ask amt. Variables that were removed from the input data were EIN, NAME and SPECIAL_CONSIDERATIONS because they were neither targets nor features.

- Compiling, Training, and Evaluating the Model
  - How many neurons, layers, and activation functions did you select for your neural network model, and why?
    - I selected 3 layers(90 neurons, 50 neurons, 20 neurons) and the 'relu' and 'sigmoid' functions and 100 epochs. I selected these parameters because after 4 attempts this was the combination that yielded the highest accuracy percentage.
  - Were you able to achieve the target model performance?
    - No, after four attempts I was not able to achieve the target model performance of 75%. I was able to achieve 73.01% accuracy through adjusting different elements of the model.
  - What steps did you take in your attempts to increase model performance?
    - In an attempt to increases model performance, I attempted dropping another column, creating more bins, added more neurons to a hidden layer, added more hidden layers, tried different activation functions for the hidden layers and increased the number of epochs to the training regimen.

Summary:

The final automatically optimized neural network trained model was able to achieved 73% prediction accuracy, using relu and sigmoid activation functions with 3 hidden layers at a 90, 50, 20 neurons split and 100 training epochs. Further analysis should be conducted to increase the predicted accuracy rate to achieve at least 75%.