Analysis of Alphabet Soup Classifier

- Data Preprocessing
    - The target for this model is the “IS_SUCCESSFUL” column of the dataset.
    - The features are the “APPLICATION_TYPE,” “AFFILIATION,” “CLASSIFICATION,” “USE_CASE,” “ORGANIZATION,” “STATUS,” “INCOME_AMT,” “SPECIAL_CONSIDERATIONS,” and “ASK_AMT” columns.
    - “EIN” and “NAME” were removed as they were neither targets or features.
- Compiling, Training, and Evaluating the Model
    - Initially two hidden layers and an output later were used. The hidden lawyers had 5 and 10 neurons respectively. Two activation functions were utilized, “relu” for its all-purpose use and “sigmoid” as it is good for classification.
    - The target model performance was not achieved, our initial model achieved 73.55% vs our target of 75%, and this was not improved upon in subsequent attempts.
    - To increase performance first the number of neurons was increased, then the number of hidden layers was increased, and finally feature engineering was tried but adding “NAME” as a feature
- Summary
    - Overall, the target results were not achieved. The initial model used two hidden layers with 5 and 10 neurons respectively which led to 73.55% accuracy.
    - Increasing the neurons to 50 and 25 resulted in 73.87% accuracy, and increasing the hidden layers to four with 50, 25, 25 and 15 neurons resulted in 73.70% accuracy.
    - It appeared this model using “relu” and “sigmoid” activation functions had reached its maximum potential. This led to feature engineering and adding the “NAME” back as a feature.
    - The “NAME” cutoff value was decided to be 10 the model was run using “NAME” as a feature. This resulted in overfitting as the training data showed 96.81% accuracy vs the test data showed 58.17% accuracy
    - Future recommendations would be to experiment with different activation functions to see if this leads to target accuracy