**Overview**

The purpose of project is to help the nonprofit foundation Alphabet Soup select the applicants for funding with the best chance of success in their ventures. The goal is to use machine learning and neural networks to apply features on a provided dataset to create a binary classifier that can predict whether applicants will be successful if funded by Alphabet Soup.

**Results**

1. *Data Preprocessing*

* What variable(s) are the target(s) for your model?

IS\_SUCCESSFUL is the target for the model because this indicate that the applicant is successful.

* What variable(s) are the features for your model?

IS\_SUCCESSFUL column is the feature chosen for this dataset.

Text

Description automatically generated with medium confidence

* What variable(s) should be removed from the input data because they are neither targets nor features?

EIN, NAME and SPECIAL\_CONSIDERATIONS features

1. *Compiling, Training, and Evaluating the Model*

* How many neurons, layers, and activation functions did you select for your neural network model, and why?

The first model used 2 hidden layers with 80, 30 neurons split with epochs=80 having an accuracy of 72.93% as shown and yield the following result

Text

Description automatically generated

The second model which was the optimized model, used 4 hidden layers 1 started with 100 neurons with a relu activation and ended with outer layer with linear activation with epochs=60 having an accuracy of 72.58% as shown and yield the following result

Graphical user interface, text, application

Description automatically generated

* Were you able to achieve the target model performance?

No as the target for the model was 75% and Optimization mode having accuracy of 72.58%

* What steps did you take in your attempts to increase model performance?

In the optimization model the following columns were dropped: EIN, NAME and SPECIAL\_CONSIDERATIONS. Increased number of hidden layers, neurons, and reduced epochs.

**Summary**

The deep learning neural network model did not reach the target of 75% accuracy. The initial model using the relu and sigmoid activations was slightly better than optimizing model. Therefore, the sigmoid demonstrated a better prediction for charity success than the linear.

I would recommend other machine learning models such as Support vector machines (SVMs) and the random forest classifier to be used to see if it can yield better accuracy performance.