Overview

The nonprofit foundation Alphabet Soup wants a tool that can help select the applicants for funding with the best chance of success in their ventures. With machine learning and neural networks, we’ll use the features in the provided dataset to create a binary classifier that can predict whether applicants will be successful if funded by Alphabet Soup.

Data Preprocessing

* The target variable for this model is the “IS\_SUCCESSFUL” column.
* The feature variables are the features for this model are the “APPLICATION\_TYPE”, “AFFILIATION”, “CLASSIFICATION”, “USE\_CASE”, “ORGANIZATION”, “STATUS”, “INCOME\_AMT”, “SPECIAL\_CONSIDERATIONS”, and “ASK\_AMT”
* The variables that should be removed from the input data because they are neither targets nor features are “EIN” and “NAME”.

Compiling, Training, and Evaluating the Model

* Initial Model
  + 1st layer – 10 neurons - relu
  + 2nd layer – 10 neurons - relu
  + 3rd layer – 1 neuron – sigmoid
  + 100 epochs
  + Accuracy – 0.7287

A screenshot of a computer code

Description automatically generated

* Optimization Model
  + Increased neurons
  + 1st layer – 20 neurons - relu
  + 2nd layer – 10 neurons - relu
  + 3rd layer – 1 neuron – sigmoid
  + 110 epochs
  + Accuracy – 0.7297

A screenshot of a computer code

Description automatically generated

* Optimization Model – another
  + Used kerastuner
  + activation': 'sigmoid', 'first\_units': 3, 'num\_layers': 2, 'units\_0': 5, 'units\_1': 3, 'units\_2': 1, 'units\_3': 1, 'units\_4': 3, 'units\_5': 9, 'tuner/epochs': 20,
  + Accuracy – 0.73399
  + 22 epochs

A screenshot of a computer program

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Summary:

This deep learning model was able to achieve moderate accuracy in predicting the success of charitable donation applicants. However, the target 75% was not achieved and at best, 73.399% was achieved. It might be necessary to run for more epochs or check for outliers.