Deep Learning Challenge Report

***Overview:***

The goal of this challenge was to assist a foundation in selecting applicants for funding. We needed to assess a variety of factors about each applying company and build a model that will help predict the chance of success for that venture.

***Results:***

This information comes from the starting ‘charity\_data.csv’ dataset.

* Data Preprocessing
  + Target variable: ‘IS\_SUCCESSFUL’
  + Feature variables: ‘APPLICATION\_TYPE’, ‘AFFILIATION’, ‘CLASSIFICATION’, ‘USE\_CASE’, ‘ORGANIZATION’, ‘STATUS’, ‘INCOME\_AMT’, ‘SPECIAL\_CONSIDERATIONS’, ‘ASK\_AMT’
  + Variables to be removed: ‘EIN’, ‘NAME’

A screen shot of a black screen

Description automatically generated

* Compiling, Training and Evaluating the Model

o Model structure

* First hidden layer: units = 80, activation = “relu”
* Second hidden layer: units = 30, activation = “relu”
* Output layer: units = 1, activation = “sigmoid”

A screenshot of a computer

Description automatically generated

o Performance

* The original data construction achieved a starting accuracy of 0.7277
* Unfortunately, after 3 attempts at optimizing the model, we were not able to achieve the target model performance of 75%.
* For optimization attempt #1, the columns ‘STATUS’ and ‘SPECIAL\_CONSIDERATIONS’ were removed since they were Bernoulli values and otherwise provided minimal value to the model. This allowed us to increase the accuracy value to 0.7303.
* For optimization attempt #2, we took changes for attempt #1 and also adjusted the binning values in the ‘APPLICATION\_TYPE’ and ‘CLASSIFICATION’ columns so less values would fall into the ‘Other’ categories. This model resulted in a slightly lower accuracy value of 0.7296.
* For optimization attempt #3, we returned to the setup of attempt #1 (since it was the most successful thus far) and increased the amount of Epochs used for training the model from 100 to 200. This actually decreased the accuracy of the model down to 0.7296.