Report on Deep Learning Analysis for Alphabet Soup, February 22, 2022

Purpose of this analysis

Data from past rounds of Alphabet Soup's charitable funding was analyzed with a deep learning neural network in order to create an algorithm that could predict which funding applicants will be successful in the future.

Data Preprocessing

- Data loaded from csv file charity_data
- Target for model: IS_SUCCESSFUL
- Features for model: APPLICATION_TYPE, AFFILIATION, CLASSIFICATION, USE_CASE, ORGANIZATION, STATUS, INCOME_AMT, SPECIAL_CONSIDERATIONS, ASK_AMT
- Variables removed: EIN, NAME

Model Results

First attempt, used two hidden layers with double-digit neurons as reasonably complex starting point, Reul activation function for its effectiveness

- Hidden layer 1: 80 neurons, relu function
- Hidden layer 2: 30 neurons, relu function
- Output layer: sigmoid function
- 72.7% accuracy

Additional attempts to improve model accuracy

- Second attempt:
    - added additional hidden layer with 50 neurons
    - 73.0% accuracy
- Third attempt:
    - added additional neurons in each layer (120, 60, 30)
    - 72.8% accuracy
- Fourth attempt:
    - Doubled number of training epochs from 100 to 200
    - 72.8% accuracy

Summary

This deep learning model is able to correctly predict the success of funding around 73% of the time, just under the target goal of 75%. A different model utilizing dimensionality reduction, such as random forests or svm may produce more accurate results.