

Neural Network Report

Overview

The purpose of this analysis is to create a tool that helps a non-profit select applicants for funding with the highest chance of success with the funding they do receive. Ultimately, the tool would be used to categorize applicants into who should get funding, and who should not.

Report

Data Preprocessing

- Target for the model is a binary yes or no representing if the funding was used by the applicant successfully, or unsuccessfully.
- Features for the model are the variables given by the applicant. They are name, tax identification number, application type, affiliation, classification, use, organization, active status, income, any special considerations, and the asking amount.
- Variables that needed to be removed were the ein and name.

Compiling, Training, and Evaluating the Model

- The number of neurons and layers in the initial model were 3 layers, with the initial layer having 80 nodes, the hidden layer with 30, and the output layer with just 1. The initial model used just the 'sigmoid' function. I started here because 'sigmoid' is a common activation function and I needed a starting point for my model before I started to optimize.
- I was not able to achieve optimal model performance.
- To increase model performance, I tried changing the number of hidden layers, the size of the hidden layers, the type of activation function, as well as the optimizer used within the neural network. I added 1 and 2 hidden layers, changed the number of nodes in each up and down, used the 'relu' activation function, and the 'adamax' optimizer.

Results Initial Model

Loss: 0.5530816912651062, Accuracy: 0.7304956316947937

Results 1st Optimization Attempt

Loss: 0.5514416098594666, Accuracy: 0.7302623987197876

Results 2nd Optimization Attempt

Loss: 0.5514979362487793, Accuracy: 0.7294460535049438

Summary

The overall results of the deep learning model were, at best, an accuracy of 73.04%. A different machine learning model that might be better suited to solve this classification problem would be a random forest classification model because the amount of data that we have is relatively low. As the number of data points increases, a neural network would potentially show more improved accuracy.