Overview

The purpose of the analysis is to predict whether organizations’ fundraising campaigns will be successful or not based on given parameters using a neural network model (NNM)

Analysis

Data was supplied in a CSV format with columns 'EIN', 'NAME', ‘APPLICATION\_TYPE', 'AFFILIATION', 'CLASSIFICATION', 'USE\_CASE', 'ORGANIZATION', 'STATUS', 'INCOME\_AMT', 'SPECIAL\_CONSIDERATIONS', ‘ASK\_AMT', 'IS\_SUCCESSFUL'. This data was used to develop the NNM used in this analysis.

Results

Data Preprocessing

Targets:

Targets for this model are supplied using the ‘'IS\_SUCCESSFUL' column which is in binary format.

Features:

The features for this model are the columns are ‘APPLICATION\_TYPE', 'AFFILIATION', 'CLASSIFICATION', 'USE\_CASE', 'ORGANIZATION', 'STATUS', 'INCOME\_AMT', 'SPECIAL\_CONSIDERATIONS', ‘ASK\_AMT'.

Unused:

The columns 'EIN', 'NAME' were unused in the model as the were not applicable for the model and gave organizations’ identifiers.

Compiling, Training, and Evaluating

Model Design:

The final model had two hidden layers with 128 neurons in each layer. RELU activation was used in each of these layers. The output layer had one neuron and SIGMOID activation. Up to four hidden layers and 256 neurons had been tested but showed no discernible increase in accuracy. The activations of TANH and LINEAR were also tested for the hidden layers and either showed no increase or a decrease in accuracy.

Performance:

After numerous variations we were unable to achieve target accuracy of 75%. Final evaluated accuracy using the Tensor Flow ‘evaluate’ function was 74%

Additional Information:

To attempt to increase model performance these steps were taken:

* Epochs were increased up to 200
* Binning of the columns ‘APPLICATION\_TYPE', 'CLASSIFICATION' was decreased
* Column 'USE\_CASE' was removed and accuracy evaluated
* Number of neurons and hidden layers was increased
* Activations used were changed and tested

Summary

After extensive testing and evaluation, the final model was decided upon based on final accuracy and use of computing resources. Even when extensive computing resources were added the model never achieved the target 75% accuracy. There was also never more than a 2% point increase from the baseline initial trial using one hidden layer with 32 neurons, and 25 epochs. The final optimized model used two hidden layers with 128 neurons each and 100 epochs.