Deep Learning Homework Analysis

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**Overview**

The objective of this assignment is to use data analysis to predict whether funding applications to the non-profit foundation *Alphabet Soup* will be successful. To make the predictions, I created and trained a deep learning neural network model. *Alphabet Soup* provided a data set with information on 34,300 applications.

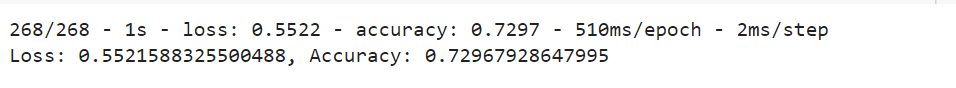
**Results**

The target variable is a binary classifier from the dataset titled “Is Successful”, with 1 denoting successful applications and 0 denoting unsuccessful applications. The model features include variables for funding amount requested, special considerations for the application, income classes of applicants, active status, organization type, use case for the funding request, the government organization classification, and the affiliated sector of industry. The data also included a name and ID number that are not targets or features and were dropped from the dataset. The classification and application type contained over 10 distinct values. After analyzing the distribution, cutoffs were identified and several values were reclassified as “Other”.

The initial neural network model contained 2 hidden layers with 8 neurons each as well as one output layer. The initial model achieved 72.5% accuracy. Three more models were attempted that added more hidden layers and added more neurons. The final model used kerastuner to hypertune the model, determining the optimal model design. The optimal parameters and model performance are depicted here:

Graphical user interface, text, application

Description automatically generated



After hypertuning the model performance increased to 72.9% accuracy, but still fell short of the target. More domain knowledge of the data values may be necessary to determine if additional data points can be binned together or dropped.