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Alphabet Soup Optimization Deep Learning Model Analysis

1. The Keras Model is a way to organize and structure a neural network. It provides a high-level interface for building, training, evaluation, and deploying deep machine learning models.
2. **Part A:** The Target variable for our model was predicting whether someone is or is not successful (binary variable of 1 or 0). The features of our Keras model were the individual’s application type and classification type (that we re-scaled to a certain cutoff point) and the rest of the dataset that was converted to dummy variables using the pandas “get\_dummies” method that converted each feature value to “TRUE” or “FALSE”. We dropped the “Name” and “EIN” columns that were used as identifiers and indices for the dataset (not necessary in our model).

**Part B:** There are 151 neurons, 3 hidden layers, and 1 activation function in my Keras neural network deep machine learning model. I did this because I saw this as the most optimal regarding the shape of the data and it was also simple enough for me to interact with. I unfortunately did not reach the target model accuracy of 75%, I was hovering around 73% and could not seem to get it to go up. I changed the number of neurons in my first hidden layer from 80 neurons to 100 neurons. I then increased the number of neurons in my second hidden layer from 30 neurons to 50 neurons. I fumbled with the number of epochs that my model went through and moving it up or down from 100 seems to lower the overall model accuracy.

1. The overall result of my Keras deep machine learning model is that it has an overall model accuracy of 73% with an overall loss of 56%. I think that the PCA supervised machine learning model would be a more optimal way of going about the analysis. The PCA learning model solely focuses its quantitative analysis on the features that have the most influence over the target variable, rather than including all the unwanted and unneeded features in the analysis, PCA allows for the encoder to focus solely on the features that have an overall high effect on the variance of the target variable.