**Neural Network Analysis:**

The purpose of this analysis was to try to use the Tensorflow and Keras tools to create a neural network for predicting if an applicant will be successful given certain criteria. The target variable was ‘IS\_SUCCESSFUL’, indicating if a company was successful after gaining funding from AlphabetSoup.

Target Variable:

* ‘IS\_SUCCESSFUL’

Features (Converted to dummy variables):

* ‘APPLICATION\_TYPE’
* ‘AFFILIATION’
* ‘CLASSIFICATION’
* ‘USE\_CASE’
* ‘ORGANIZATION’
* ‘STATUS’
* ‘INCOME\_AMT’
* ‘SPECIAL\_CONSIDERATIONS’
* ‘ASK\_AMT’

Not Considered:

* ‘NAME’
* ‘EIN’

To build the neural network, I started by manually messing with the number of neurons, layers, and activation functions. I looked at the documentation and explored activation functions and layers we didn’t cover in class such as ‘elu’ and dropout layers. With just randomly making changes, I was not able to reach the .75 threshold so I changed strategy and decided to use the keras tuner to try many different combinations and choose the optimal one. The optimal model returned from the tuning is shown below: Text

Description automatically generated

This output returned a model of 6 layers where the activation for the first was ‘sigmoid’ and the remaining 5 were ‘relu’. I tried running the keras tuner several times, changing the inputs on the number of neurons and expanding the list of activatio function even further. I also tried expanding and reducing the number of features by increasing and decreasing my thresholds for observations on the values of ‘CLASSIFICATION’ and ‘APPLICATION\_TYPE’. None of the changes I made allowed me to reach the .75 threshold for accuracy.

In summary, changing parameters and hyperparameters of the model did little to change the overall accuracy of the model. Because changing the parameters didn’t do much to significantly increase the accuracy, I feel like a KNN model would do a good job. I imagine there are probably a number of clusters that could be used to classify the success with more accuracy and less overfitting.