**Neural Network Model Report**

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**Overview:** This analysis was conducted using charity data. The data set contained the following data:

A screenshot of a phone

Description automatically generated

The goal of the analysis was to create a neural network model that was at least 75% accurate at predicting if a charity application was successful (target variable = `IS\_SUCCESSFUL`). For all attempts, columns `NAME` and `EIN` were removed.

**Results:**

Attempt 1:

* All features were converted to dummy columns except `ASK\_AMT` and `STATUS`, as those were already in numeric format.
* `APPLICATION\_TYPE` values that occurred fewer than 500 times in the data set were bucketed into an “Other” category
* `CLASSICATION` values that occurred fewer than 1000 times in the data set were bucketed into an “Other” category.
* The neural network model was configured with a ReLU input layer with 16 units, two hidden ReLU layers with 16 units, and a sigmoid ouput layer with 1 unit
* The results after training on 100 epochs were Loss: 0.554955005645752, Accuracy: 0.7267638444900513

Optimization:

* The `STATUS` feature only had 5 values of “0” in the entire set, so the feature was removed
* `SPECIAL\_CONSIDERATIONS` only had 27 values of “Y” so this was removed at first as well.
  + Changing nothing else, the model still showed an accuracy of approximately 72.5%
* Thresholds for the `APPLICATION\_TYPE` and ` CLASSICATION` bins were lowered to 25 and 100 respectively
  + Coupled with changes above, the model still showed no notable improvement.
* On the last attempt, `SPECIAL\_CONSIDERATIONS` was added back into the features.
* Additionally, in the final attempt the input layers units were boosted to 50, the first hidden layer’s units bumped to 25, and the last hidden layer’s units were set to 10
  + Unfortunately, this showed no improvement in the model’s accuracy

**Summary:**

I was unable to tune the parameters and features to show any meaningful boost in accuracy with this neural network, as the model’s accuracy score stayed around 72.5% in all attempts.

A couple options to see improvement would be:

* invest more time in parameter and feature tuning
* Try a different classification model such as Logistic Regression and compare it’s accuracy to the neural network.