Neural Network Homework Report

The goal of this assignment is to use a neural network algorithm to evaluate and predict whether or not funding for loan applicants based on application details would be successful. The following is the information that will be used in the algorithm:

Results
Data Preprocessing
What variable(s) are neither targets nor features, and should be removed from the input data?
- Removed the EIN and NAME features, as these are metadata

What variable(s) are considered the target(s) for your model?
- Since this is a classification model, the IS_SUCCESSFUL feature is the target

What variable(s) are considered to be the features for your model?
- After one-hot encoding all of the remaining features were the multi-variate features passed in

Compiling, Training, and Evaluating the Model
How many neurons, layers, and activation functions did you select for your neural network model, and why?
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- Ultimately the sigmoid activation function, 3 neurons per, and 3 layers were used. These provided the highest model accuracy during a loop search.

Were you able to achieve the target model performance?
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- Unfortunately, even with a hyperparameter optimization, the model could not perform above 75%.

What steps did you take to try and increase model performance?
Using the keras tuner, the model was tested against every combination of relu, tanh, and sigmoid activate functions at 1-10 neurons in the first layer, 1-6 hidden layers (each between 1-10 neurons), and an output layer.

Summary
The neural model revealed a reasonable aptitude for forecasting charity success in this initial testing, providing Alphabet Soup with further information on which organizations to sponsor in the future. Further optimizations (alternative preprocessing, new data, etc.) and testing (testing model variance to check for overfitting) might be done in the future to ensure the model's effectiveness.
Applying a PCA and/or tSNE model during the preprocessing step to reduce the number of features is one specific technique to change the model (and therefore, the amount of noise).