**Overview**:

The purpose of this analysis is to use neural networks in order to select which charity organizations would have the best chance of success should they fund them. The model does this by taking the various different factors from the dataset and using them to predict whether a new applicant would be successful based on the trends of the previous data.

**Results**:

Data Processing:

* The target variable is the is\_successful variable. This is a value of either 0 or 1, with 0 being unsuccessful and 1 being successful.
* The feature variables are the rest of the dataset. This includes the applicant type, their affiliation, income amount, ask amount, and more.
* We removed the EIN number and the charity names as these are irrelevant for the model.

Compiling, Training, and Evaluating the Model:

* Initially, we used two hidden layers and an output layer. We use “relu” for the two hidden layers and “sigmoid” for the output layer and the two hidden layers had 6 neurons. We used these as these act as a standard for the model which we can then compare future optimization methods to.
* From the performance test, we had an accuracy of 72% and a loss percentage of 55%. This did not meet expectations as the accuracy was low and the loss is quite high.
* In order to increase the performance, we used auto-optimization methods to determine the best number of layers and neurons. Using kerastuner, we can have the model select between “relu”, “tanh”, or “sigmoid” as the activation. We then use kerastuner to select between 1 or 10 neurons in the first layer. Lastly, we had it choose between 1 and 6 hidden layers and 1 or 10 neurons for each layer. However, from the performance test, the model did not make any significant improvements, with the loss percentage being 57% and the accuracy percentage being 73%.

**Summary:** Ultimately the neural network model did not meet expectations and thus is not a reliable predictor for successful or unsuccessful charity organizations. Since there are many different factors in the dataset, some good models that could serve the same purpose are decision tree models and random forest models. These are supervised learning models that work well with larger datasets and can determine the factors that are most important for the model.