

# Report on Neural Network Model

## Outline

For this analysis, I worked with a nonprofit named Alphabet Soup that wanted help decided which applicants it should fund. The model I created would predict whether the organization that was funded would be successful based on multiple features. I created two neural networks and compared them to see which one would have better accuracy.

## Results

### Data Preprocessing

- The variable that was the target for this model was the 'IS SUCCESSFUL' column which showed whether the organization successfully used the funding that was given to them.
- The columns that were used for the features include: Application Type, Affiliation, Classification, Use Case, Organization, Status, Income Amount, Special Considerations, and Ask Amount.
- The variables that were removed were the identification columns such as the 'NAME' and 'EIN' because they did not affect the model.

### Compiling, Training and Evaluating the Model

- The number of layers I used for the model were three layers: an input layer, a hidden layer, and output layer. The number of neurons for the input layer were 25, then 15 for the hidden layer, and then 1 layer for the output layer. The activation functions that I selected for the first two layers were 'relu' and then 'sigmoid' for the output layer.

- Unfortunately, my model was not able to reach the desired target accuracy of 75% but it was able to get close and achieved an accuracy of 73%.
- To increase the models performance, I used the tuner to go through the 'relu' and 'tanh' activation functions, as well as decide the number of neurons in the first layer between 1 and 30. I also allowed the tuner to decide how many hidden layers there should be as well as how many neurons should be in those layers.

## Summary

In this report, a neural network was created to help Alphabet Soup decide which applicants it should fund. The target variable was the 'IS SUCCESSFUL' column, and the features included Application Type, Affiliation, Classification, Use Case, Organization, Status, Income Amount, Special Considerations, and Ask Amount. The identification columns such as 'NAME' and 'EIN' were removed. Two neural networks were created, and the one with three layers, with 25 neurons for the input layer, 15 for the hidden layer, and 1 for the output layer, using the 'relu' activation function for the first two layers and 'sigmoid' for the output layer, achieved an accuracy of 73%. The tuner was then used to improve the model's performance, but the desired target accuracy of 75% was not reached.