### Challenge 21 Analysis -  Report on the Neural Network Model

### Purpose:

### To assist the foundation Alphabet Soup in selecting applicants for funding with the best chance of success in their ventures.

### We used neural networks to create a machine learning model to predict whether applicants can be successful if sponsored by Alphabet Soup.

### Results:

### Data Processing:

### *What variable(s) are the target(s) for your model?* The variable for the model is the column “IS\_SUCCESSFUL”

1. *What variable(s) are the features for your model?* All other columns except for the identification columns (EIN and Name)
2. *What variable(s) should be removed from the input data because they are neither targets nor features*? The identification columns (EIN and Name)

**Compile, Train and Evaluate the Model**

1. *How many neurons, layers, and activation functions did you select for your neural network model, and why?*: I’ve opted to use the Keras tuner model let Keras determine the activation and the suitable number of hidden layers and suitable number of neurons in each layer.

Per the Keras tuner, the model should be composed as follows

A screenshot of a computer program

Description automatically generated

1. *Were you able to achieve the target model performance?*

The model provided 73% accuracy rate with 55% loss

1. *What steps did you take in your attempts to increase model performance?*

To increase the model performance I performed the following changes:

* Changed the model activation method from sigmoid to Relu for all hidden layers.

Result: slight increase in loss from 55.4 to 55.7 and a decrease in accuracy rate to 72.8%

* Kept Sigmoid as activation and Increased the number of epochs from 100 to 200:

Results: the loss slightly increased to 55.8 % accuracy rate remained at 72.8%

**Conclusion**: the changes made actually decreased the performance of the model. The keras tuner model remains the best for the testing.