# Neural Network Model Analysis

## Overview

This model aims to test if Alphabet Soup-funded organizations will see success. The model features application type, classification, and funding amount for classifying success. This helps Alphabet Soup prioritize funding for the organizations most likely to succeed.

## Results

### Preprocessing (Q:1-3), Compiling, Training, Evaluating (Q:4-6)

1. **What variable is the target for this model?-**The target variable is “IS\_SUCCESSFUL” which indicate whether the funding was a success.
2. **Variable Features of the model:** The columns such as “APPLICATION\_TYPE”, “CLASSIFICATION”, “ASK\_AMT”, and “USE\_CASE”.
3. **Variables that should be removed because they are irrelevant:** The “EIN” and “NAME” did not help the model so they were not included
4. **Amount of Neurons, Layers, Activation Functions and why they were selected:** This model features 3 hidden layers with 100, 50, and 20 neurons. I Used ReLU and tanh activation functions to help the model observe complex patterns in the data.
5. **Was the Target Model Performance achieved?**-No. The model accuracy was 72.6% which is 2.4% under the target.
6. **Steps taken to optimize performance:** I added a third hidden layer, increased number of neurons in the first layer, used tanh activation in the second layer, added a dropout layer to prevent overfitting, Increased number of epochs to 200, and used the RMSprop optimizer instead of adam

## Summary

The deep learning model almost achieved the target (75%) but fell short by 2.4%. Optimizations improved the model byt it still has trouble with high confidence. One can draw the conclusion that the data may have complex patterns that are hard for the neural network to capture.

## Describe how you could use a different model to solve the same problem, and explain why you would use that model.

Random Forest Network would be better suited as it handles imbalance data well, shows non-linear relationships between the feature and target, and wont overfit as much as neural networks. Random Forest is also simpler to make.

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