**Module 21- Neural Network Challenge**

Overview:

This machine learning model is designed to find which applicants have the greatest chance of success if they receive funding. Provided is the data of over 34,000 organisations which includes the name, application type, industry, government organisation classification, use case for funding, organisation type, active status, income classification, special considerations for application, funding amount requested and if the organisation was successful or not.

Results:

Data Preprocessing

What variable is the target for your model?

The target for the model is IS\_SUCCESSFUL

What variables are the features for your model?

APPLICATION\_TYPE, AFFILIATION, CLASSIFICATION, ORGANISATION, USE\_CASE, INCOME\_AMT and ASK\_AMT are all the feature variables used for the model, as they contain a vast range of data which can be used to help train the model.

What variables should be removed from the input data because they are neither targets nor features?

Columns EIN and NAME were removed as they have no impact on the neural network model. STATUS and SPECIAL CONSIDERATIONS were also dropped, as I checked the value counts on them and discovered that they have an overwhelming majority to one value. In my opinion, it is pretty much 100 percent in favour of a particular value.

Compiling, Training, and Evaluation the model

How many neurons, layers and activation functions did you select for your neural network model and why?

In my first attempt, I had two layers with 6 neurons in each layer. This seemed like a good place to start and find out how much the accuracy score is. Then I can adjust accordingly. I achieved an accuracy of 73.43%.

On my second attempt I applied two layers, however I increased the neurons to 10 on both layers, with an epochs of 200.

This only slightly increased the accuracy to 73.77%.

The third attempt included 3 layers, all with 12 neurons and 200 epochs. This returned an accuracy of 74.15%.

Summary:

I failed to achieve an accuracy of over 75%, yet came very close. My third attempt returned an accuracy of 74.15%, so this is the recommended model to use. It contains 3 layers with 12 neurons in each layer. However, if speed and computer power is an issue, the first two models could work, but return a slightly lower accuracy score.