**Neural Network Model Report**

**Overview of the analysis**: A nonprofit organization wants to create a model that helps accurately predict whether or not applicants will be successful if they receive funding from the organization AlphabetSoup.

**Results**: Using bulleted lists and images to support your answers, address the following questions.

**Data Preprocessing**

What variable(s) are considered the target(s) for your model?

* IS\_SUCCESSFUL – whether or not the funding money was used effectively

What variable(s) are considered to be the features for your model?

* APPLICATION\_TYPE - application type
* AFFILIATION - affiliated sector of industry
* CLASSIFICATION - government organization classification
* USE\_CASE - use case for funding
* ORGANIZATION - organization type
* STATUS - active status
* INCOME\_AMT - income classification
* SPECIAL\_CONSIDERATIONS - special consideration for application
* ASK\_AMT - funding amount requested

What variable(s) are neither targets nor features, and should be removed from the input data?

* EIN – ID of applicant
* NAME – name of applicant

**Compiling, Training, and Evaluating the Model**

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

* For my base model, I selected two layers with 5 neurons each using the Relu and Sigmoid activation functions, because this is the basic setup we used in class activities, so I wanted to see how the model would react with these basic inputs

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Were you able to achieve the target model performance?

* No, even though I tried dropping more columns, increase the number of hidden layers, and decrease the number of epochs

What steps did you take to try and increase model performance?

* For my first attempt:
  + I increased the number of neurons for each layer, from five to ten
  + Kept everything else the same

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* For my second attempt:
  + I increased the number of layers from two to three
  + I put eight neurons in the first layer
  + Five neurons in the second and third layer, and
  + Decreased the number of epochs to 50.

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* For my third attempt:
  + I dropped the columns “SPECIAL\_CONSIDERATIONS\_N”, “SPECIAL\_CONSIDERATIONS\_Y”, and “STATUS” to decrease noise
  + Used three layers
  + Put 10 neurons in the first layer,
  + Put 8 neurons in the second layer, and
  + Put 5 neurons in the third layer

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**Summary**: Since the overall accuracy score was not above 75% with the neural networks model, we could use the Random Forest classifiers. This is because random forest is a robust and accurate model due to their sufficient number of estimators and tree depth. Also, the random forest models have a faster performance than neural networks and could prevent the data from being overfitted.