**Report on the Neural Network Model**

**Overview:**

The nonprofit foundation Alphabet Soup wants to use a binary classifier tool that can predict whether applicants will be successful if funded by Alphabet Soup. Having a large dataset of about 34,000 organizations that recieved funding from Alphabet Soup over theyears, the purpose of this analysis was to clean (preprocess) the data, compile, train, optimize and evaluate a machine learning model to predict if applicant will be successful upon funding by Alphabet Soup.

**Results:**

The data was first cleaned by removing irrelevant infomration. The data was then split for training and testing sets. The target variable was then labelled accordingly (IS\_SUCCESSFUL with value of 1 for yes and 0 for no). For binning, the classification method was used and several data points were used as a cutoff to bin "rare" variables together with the new value of "Other" for each unique value. Categorical variables were encoded by get\_dummies() after checking to see if the binning was successful.

Overall, two hidden layers and one output layer were used for each model respectively. 3 optimization models were executed in total. The 3 models produced 72.6%, 72.4% and 72.1% accuracy over 8,561, 7,999 and 13,953 parameters respectively. The following figures represent layers used for each model along with their evaluation results.

**Conclusion:**

Overall, the 3 neural network models scored fairly in predicting applicant success rate upon funding by Alphabet Soup. The accuracy varied from 72.1 to 72.6% in 3 different scenaries. Adapting the model to incorporate more rare variables should help in increasing the accuracy of the model.

**Model 1**

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**Model 2**

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**Model 3**

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