**Charity Funding Predictor Report**

Deep learning and neural networks were utilized to assess the likelihood of successful funding for applicants by Alphabet Soup, a previous funder for more than 34,000 organizations.

**Data Processing:**

The dataset underwent preprocessing by eliminating irrelevant information, resulting in the removal of EIN and NAME from the model. The remaining columns were treated as features for the model. However, NAME was reintroduced during the second test. CLASSIFICATION and APPLICATION\_TYPE were substituted with 'Other' due to their high fluctuation. The data was then divided into training and testing sets. The target variable for the model was "IS\_SUCCESSFUL," with a value of 1 representing yes and 0 indicating no. The APPLICATION data was analyzed, and the values of CLASSIFICATION were used for grouping. Each unique value served as a cutoff point to merge "rare" categorical variables into a new category called 'Other.' The success of this grouping was subsequently verified. Categorical variables were encoded using 'pd.get\_dummies()'.

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

A neural network was employed, comprising multiple layers—specifically, three layers. The number of hidden nodes in each layer was determined by the number of features.

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A three-layer training model produced 477 parameters. The initial attempt achieved a close accuracy of 72%, which fell slightly below the desired 75%.

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**Optimization:**

In the second attempt, 'NAME' was reintroduced into the dataset, resulting in a higher accuracy of 79%, surpassing the target by 4%. A total of 3,298 parameters were involved.

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Deep learning models typically employ multiple layers as they leverage machine-based processes to guide computers in filtering inputs through these layers and learning how to predict and classify information.

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