***Report on Predicting Applicant Success for Funding from Alphabet Soup***

**Overview of the Analysis**

In this analysis, we aimed to develop a predictive model that can help Alphabet Soup select applicants for funding with the best chance of success in their ventures. The model utilizes machine learning and neural networks to analyze the provided dataset and create a binary classifier to predict whether applicants will be successful if funded by Alphabet Soup.

**Results**

**Data Preprocessing**

* Target Variable(s): The target variable for our model is 'IS\_SUCCESSFUL,' representing whether an applicant was successful or not if funded.
* Features for the Model: The features used in the model include all columns except 'IS\_SUCCESSFUL.' These features are preprocessed and converted into numeric values using one-hot encoding.
* Variables Removed: We removed the non-beneficial ID columns, namely 'EIN,' and 'NAME.'

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

* Neural Network Architecture: We utilized a hyperparameter tuning approach to determine the optimal neural network architecture. The best model configuration includes two hidden layers with 5 and 1 neurons, using the tanh activation function. The output layer uses a sigmoid activation function.
* Model Performance: With the best hyperparameters, the model achieved an accuracy of approximately 72.85% on the test data after training for 100 epochs.

**Optimizing the Model**

* Ran Keras tuner for best activation, input features, # of hidden layers, and # of neurons in each layer and ran the model with the recommendations.
* Reducing the number of epochs to 50 slightly decreased the accuracy to 72.84%. Additionally, when testing with 100 epochs and without the 'EIN' column, the model achieved an accuracy of 73.28%.

**Summary**

The deep learning model shows promise in predicting applicant success for funding by Alphabet Soup. However, there is still room for improvement in model performance. To address this classification problem differently, I would recommend a machine learning algorithm such as Random Forest or Gradient Boosting, which may offer better accuracy and interpretability for this specific dataset.

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A screenshot of a computer program

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