**Overview of the Analysis**

The purpose of this analysis is to create a deep learning model to predict the success of charity applications for funding provided by Alphabet Soup. The goal is to build a neural network model with a target predictive accuracy of at least 75%, using the provided dataset. The analysis involves data preprocessing, model creation, and optimization to achieve the desired performance.

**Results**

**Data Preprocessing**

* **Target Variable:**
  + IS\_SUCCESSFUL: This variable indicates whether the charity application was successful (1) or not (0).
* **Feature Variables:**
  + All remaining columns after preprocessing, which include:
    - Categorical variables such as APPLICATION\_TYPE, AFFILIATION, CLASSIFICATION, USE\_CASE, ORGANIZATION, INCOME\_AMT, SPECIAL\_CONSIDERATIONS, and ASK\_AMT, converted to numeric using one-hot encoding.
* **Removed Variables:**
  + EIN and NAME: These columns were removed as they are identification columns and do not contribute to the prediction of the target variable.

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

* **Model Architecture:**
  + **Neurons:**
    - First hidden layer: 100 neurons
    - Second hidden layer: 80 neurons
    - Third hidden layer: 60 neurons
    - Fourth hidden layer: 40 neurons
    - Fifth hidden layer: 20 neurons
  + **Layers:**
    - Input layer
    - Five hidden layers
    - Output layer
  + **Activation Functions:**
    - Hidden layers: relu (Rectified Linear Unit)
    - Output layer: sigmoid (for binary classification)
* **Model Performance:**
  + **Achieved Accuracy:** 72.77%
  + **Target Accuracy:** 75%
* **Optimization Steps:**
  + Increased the number of neurons in each hidden layer to enhance the model's learning capacity.
  + Added additional hidden layers to increase model depth.
  + Implemented Dropout layers to prevent overfitting.
  + Used BatchNormalization to stabilize and accelerate training.
  + Employed EarlyStopping to halt training when the validation loss stopped improving.
  + Used ReduceLROnPlateau to adjust the learning rate when the validation loss plateaued.

**Summary**

Despite multiple optimization attempts, the highest accuracy achieved by the deep learning model was 72.77%, which is below the target accuracy of 75%.