Analysis

1. Overview:

The goal of this analysis was to develop a deep learning model capable of predicting the success of charitable organizations funded by Alphabet Soup. By analyzing the provided dataset, the goal was to uncover patterns and factors that contribute to an organization's successful use of funds. The ultimate objective was to assist Alphabet Soup in making data-driven decisions when selecting organizations to support.

2. Results:

Data Preprocessing:

- The target variable for our model was `IS_SUCCESSFUL`.
- The features used in the model included: `APPLICATION_TYPE`, `AFFILIATION`, `CLASSIFICATION`, `USE_CASE`, `ORGANIZATION`, `STATUS`, `INCOME_AMT`, `SPECIAL_CONSIDERATIONS`, and `ASK_AMT`.
- The `EIN` and `NAME` columns were removed from the dataset as they are identification variables.

Compiling, Training, and Evaluating the Model

- The input layer was designed to accept all the preprocessed features. I implemented two hidden layers with 7, and 14 neurons. The activation function used was relu. The output layer consisted of one neuron with a sigmoid activation function.
- The initial model achieved an accuracy of approximately 72.8%. After several optimization attempts, and decreasing the number of neurons, the accuracy improved to 78.6%.
- The optimization steps include reducing the number of hidden nodes to simplify the model and reduce overfitting and adjusting the model to lessen the complexity.

3. Summary:

- The deep learning model developed for this analysis achieved an accuracy of 78.6%. The optimization efforts led to a simpler model with higher accuracy. By reducing the number of nodes in the hidden layers, we decreased overfitting and improved the model's performance on test data. Further optimization for the future could include using different neural network architectures or using different activation functions.