Report

1. **Overview of the analysis: Explain the purpose of this analysis.**

   The purpose of this analysis is to assist Alphabet Soup, a nonprofit foundation, in optimizing its funding decisions by predicting the likelihood of success for applicants. By utilizing machine learning techniques and neural networks, the goal is to develop a binary classifier that can effectively distinguish between applicants who are likely to succeed if funded and those who are not. This predictive model aims to enhance the foundation's decision-making process, enabling it to allocate resources more efficiently and support ventures with the greatest potential impact.

2. **Results: Using bulleted lists and images to support your answers, address the following questions:**

- **Data Preprocessing**
   - **What variable(s) are the target(s) for your model?**

     The target variable is the 'IS_SUCCESSFUL' column from application_df.

   - **What variable(s) are the features for your model?**

     The feature variables were derived from the "application_df" by excluding the "IS_SUCCESSFUL" column, encompassing every other column in the original dataframe. This approach ensured that the feature set comprised all relevant attributes for predicting the success of applicants, facilitating a comprehensive analysis.

   - **What variable(s) should be removed from the input data because they are neither targets nor features?**

     Both 'EIN' and 'NAME' columns were dropped/removed, because they were neither targets nor features for the dataset.

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

- **How many neurons, layers, and activation functions did you select for your neural network model, and why?**

  In my initial attempt, I constructed a neural network with 80 neurons in the first layer, 30 neurons in the second layer, and three layers in total (including the input and output layers). I opted for the Rectified Linear Unit (ReLU) activation function, as it's widely used and known for its effectiveness. Given the substantial size of my dataset, I aimed for a larger number of neurons to potentially enhance the model's performance.

- **Were you able to achieve the target model performance?**

  Unfortunately, I was not able to achieve the results.

- **What steps did you take in your attempts to increase model performance?**

  Firstly, I drop some more columns form the data frame which I thought were not helping much. Secondly, I added more layers and change the numbers of epoch. Thirdly I tried different activation function which is TanH. Although I tired these methods, I still could not get results higher than 75%.

3. **Summary: Summarize the overall results of the deep learning model. Include a recommendation for how a different model could solve this classification problem, and then explain your recommendation.**

   In summary, the deep learning model achieved approximately 73% accuracy in tackling the classification problem. Enhancing the correlation between input and output variables is expected to lead to improved prediction accuracy. This could involve conducting further data cleanup initially and employing a model with varied activation functions, iterating until a higher accuracy threshold is attained.