

"Performance of the deep learning model for "Alphabet Soup."

Overview of the Analysis

The purpose of this analysis is to develop a deep learning model for Alphabet Soup, a nonprofit foundation, to assist in the selection of funding applicants with a high chance of success in their ventures. The model's objective is to predict whether organizations that have received funding from Alphabet Soup in the past have used the funds effectively (binary classification: 1 for effective use, 0 for ineffective use) based on various features associated with each organization.

Results

Data Preprocessing

- **Target Variable:** The target variable for our model is 'IS_SUCCESSFUL,' which indicates whether the funding provided by Alphabet Soup was used effectively (1) or not (0).
- **Features:** The features used for the model include a variety of categorical and numerical variables, such as 'APPLICATION_TYPE,' 'AFFILIATION,' 'CLASSIFICATION,' 'USE_CASE,' 'ORGANIZATION,' 'STATUS,' 'INCOME_AMT,' 'SPECIAL_CONSIDERATIONS,' and 'ASK_AMT.'
- **Variables Removed:** Variables such as 'EIN' and 'NAME' were removed from the input data as they were identifiers and didn't provide meaningful information for prediction.

Compiling, Training, and Evaluating the Model

- **Neurons and Layers:** The neural network model was designed with two hidden layers. The first hidden layer had 128 neurons with the 'relu' activation function, and the second hidden layer had 64 neurons also with the 'relu' activation function. The output layer had one neuron with the 'sigmoid' activation function to perform binary classification.
- **Model Performance:** The initial model provided the following results:
 - Loss: 0.5605
 - Accuracy: 0.7274
- **Target Model Performance:** The target model performance was set to achieve an accuracy higher than 75%. However, the initial model's accuracy of 72.74% did not meet this target.
- **Steps to Increase Model Performance:**
 - **Feature Scaling:** Standard Scaler was applied to normalize numerical features.
 - **One-Hot Encoding:** Categorical variables were one-hot encoded to make them suitable for the model.
 - **Label Encoding:** For categorical variables with only two unique values, label encoding was applied.
 - **Neural Network Optimization:** Attempts were made to increase model performance by adjusting the number of neurons and layers. Despite trying different configurations, the model did not achieve an accuracy higher than 75%.

Summary

The deep learning model designed for Alphabet Soup achieved an accuracy of approximately 72.74%, falling short of the target accuracy of 75%. Despite various attempts to optimize the model by adjusting architecture and preprocessing techniques, we were unable to reach the desired accuracy level.

