

Report on the Neural Network Model

1. Overview of the Analysis

The purpose of this analysis is to develop a deep learning model for Alphabet Soup that predicts the success of funding applications based on various features. The model is designed to assist Alphabet Soup in determining which organizations are likely to be successful after receiving funding, improving the efficiency of the application review process.

2. Results

Data Preprocessing

Target Variable:

The target variable for the model is IS_SUCCESSFUL, indicating whether the funding application was successful (1) or not (0).

Features:

Features include various columns such as APPLICATION_TYPE, AFFILIATION, CLASSIFICATION, USE_CASE, ORGANIZATION, STATUS, INCOME_AMT, and SPECIAL_CONSIDERATIONS.

Variables to Remove:

Some variables, such as EIN and NAME, were removed as they do not contribute to the prediction.

Compiling, Training, and Evaluating the Model

Model Architecture:

The model architecture includes a neural network with two hidden layers.

The first hidden layer has 128 neurons and uses the ReLU activation function.

A dropout layer is added to prevent overfitting.

The second hidden layer has 64 neurons with the hyperbolic tangent (tanh) activation function.

The output layer has one neuron with a sigmoid activation function for binary classification.

Achievement of Target Performance:

The target performance was not achieved in the initial model.

Steps to Increase Model Performance:

Increased the number of neurons in the first hidden layer.

Added a dropout layer to reduce overfitting.

Used a different activation function (tanh) in the second hidden layer.

Experimented with the number of epochs during training.

3. Summary

The deep learning model achieved some improvement through architectural modifications, but the target performance of 75% accuracy was not consistently reached. Further optimization may require additional feature engineering, hyperparameter tuning, or considering alternative models.