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Module 21 Challenge

Report

**OVERVIEW**

The goal of this analysis is to create and test a deep learning model to predict if charity funding applications will be successful. This will help Alphabet Soup make better decisions on which applications to support, ensuring they make the most impact with their funds.

**RESULTS**

**Data Preprocessing**

**Target Variable:**

* IS\_SUCCESSFUL

**Feature Variables:**

* All other columns after dropping non-beneficial columns and encoding categorical variables.

**Removed Variables:**

* EIN and NAME columns were removed as they are not relevant to the prediction.

**Compiling, Training, and Evaluation of Model**

* **Number of Neurons:**
  + Layer 1: 8 neurons
  + Layer 2: 5 neurons
  + Output Layer: 1 neuron
* **Number of Layers:**
  + 2 hidden layers
  + 1 output layer
* **Activation Functions:**
  + Hidden Layer 1: ReLU
  + Hidden Layer 2: Sigmoid
  + Output Layer: Sigmoid

**Model Performance:**

* The model achieved an accuracy of approximately 73% on the test data.

**Steps Taken to Increase Performance:**

* Experimented with different numbers of neurons and 2-4 hidden layers.
* Changed the hidden layer activation type for each layer from relu to sigmoid and vice versa to test effectiveness.
* Trained the model for 100, 50, and 25 epochs during optimization in Google colab.

**SUMMARY**

The deep learning model created for this analysis was able to predict the success of charity funding applications with about 73% accuracy. There is still a possibility for improvement.

Trying other machine learning models like Random Forest Classifier might result in better training and accuracy. Also, tweaking the model inputs, adding new features from the data, and splitting them into various datasets by dropping fewer effective columns may help boost accuracy.

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