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| [13/08/2024] |

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| Neural Network Model Report |

# **Overview of Analysis**

# This analysis aims to develop and evaluate a deep learning model to predict the success of funding applications to Alphabet Soup, a fictitious charity. The primary goal is to build a neural network that accurately classifies whether an application will be successful based on various input features.

## **Results**

## **2.1 Data Preprocessing**

## Target Variable(s):

## The target variable for the model is IS\_SUCCESSFUL, which indicates whether a charity's application was successful (1) or not (0).

## Feature Variable(s):

## The feature variables are all other columns except IS\_SUCCESSFUL, including:

## APPLICATION\_TYPE

## AFFILIATION

## CLASSIFICATION

## USE\_CASE

## ORGANIZATION

## STATUS

## INCOME\_AMT

## SPECIAL\_CONSIDERATIONS

## ASK\_AMT

## Removed Variables:

## The non-beneficial ID columns EIN and NAME were removed as they are identifiers and not informative for predicting the success of an application.

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

## **3.1 Neurons, Layers, and Activation Functions**

## The neural network consists of:

## First Hidden Layer: 80 neurons, tanh activation.

## Second Hidden Layer: 30 neurons, tanh activation.

## Output Layer: 1 neuron, tanh activation.

## These choices balance model complexity and efficiency, aiming to capture key patterns in the data.

## **3.2 Model Performance**

## Accuracy: The model achieved 72.75% accuracy on the test data.

## Loss: The test loss was 0.0946.

## These results are not bad, though there's room for improvement, especially since a higher accuracy is more optimal.

## **3.3 Steps to Improve Performance**

## Compilation: Initially used adam optimizer with binary\_crossentropy loss. Later, switched to huber loss to better handle outliers.

## Training:

## Validation Split: 15% to monitor overfitting.

## Epochs and Batch Size: Trained for 100 epochs with a batch size of 50.

## Evaluation: The model was tested on unseen data, confirming an accuracy of 72.75%.

## **Summary**

In summary, while the model's performance was satisfactory, it did not fully achieve the desired target. Future work could involve experimenting with different architectures, activation functions, or even alternative models to further enhance accuracy and reduce loss.