Neural Network Model – Charity Funding Predictor

**Overview**

The non-profit foundation, Alphabet Soup, would like to create an algorithm to predict whether applicants receiving funding will be successful. Data collected over the years will be utilized to create a binary classifier through machine learning and neural networks.

**Results**

Target Variable

1. \*\*IS\_SUCCESSFUL\*\*—Was the money used effectively

Feature Variables

1. \* \*\*APPLICATION\_TYPE\*\*—Alphabet Soup application type
2. \* \*\*AFFILIATION\*\*—Affiliated sector of industry
3. \* \*\*CLASSIFICATION\*\*—Government organization classification
4. \* \*\*USE\_CASE\*\*—Use case for funding
5. \* \*\*ORGANIZATION\*\*—Organization type
6. \* \*\*STATUS\*\*—Active status
7. \* \*\*INCOME\_AMT\*\*—Income classification
8. \* \*\*SPECIAL\_CONSIDERATIONS\*\*—Special consideration for application
9. \* \*\*ASK\_AMT\*\*—Funding amount requested

Variables Removed from Input Data

1. \* \*\*EIN\*\* and \*\*NAME\*\*—Identification columns

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | **Layers** | **Activation Function** | **Epoch** | **Performance**  **(Loss/Accuracy)** |
| 1 | 2 | relu, sigmoid | 50 | .55/.725 |

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

**Table

Description automatically generated**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | **Layers** | **Activation Function** | **Epoch** | **Performance**  **(Loss/Accuracy)** |
| 2 | 3 | relu, tanh, sigmoid | 100 | .55/.725 |

**Compiling, Training, and Evaluating the Model (cont)**

Table

Description automatically generated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | **Layers** | **Activation Function** | **Epoch** | **Performance**  **(Loss/Accuracy)** |
| 3 | 4 | relu, tanh, tanh, sigmoid | 150 | .55/.726 |

**Table

Description automatically generated**

Model 1 and Model 2 - increase in epochs and layers ; no adjustment to bin – no change to performance. Model 3 – increase in epochs and layers; adjustment to bin (both ‘APPLICATION\_TYPE ‘ and ‘CLASSIFICATION’ – minimal increase in performance.

**Summary**

Three separate models were created with varying degrees of adjustments to layers, activation functions, epochs, and in binning of dataset, however, performance accuracy never reached goal of .75, settling in the .725 range. The slight increase in accuracy in Model 3 may indicate that adjustments to dataset and increases in layers, functions and epochs could increase accuracy. Recommendation for further increases to layers and epochs and more variations to activation functions and bin range should be done until accuracy shows a decline.