**Neural Network Model Report**

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**Overview**

In this project I was tasked with creating an algorithm that uses neural networks and machine learning to make predictions on whether or not an applicant will receive funding from a notional non-profit foundation in their ventures. I created a binary classifier that can predict whether applicants will be successful.

**Process**

I read the provided CSV file with more than 34,000 organizations into Pandas. This CSV included data about these organizations and whether the foundation has provided funding.

1. Data Preprocessing

To preprocess the data I completed the following:

* + - * dropped non-essential columns EIN and NAME.
      * determined the data points for the necessary column’s unique values.
      * chose cutoff values of 600 and 300, respectively.
      * converted categorical data to numeric.
      * divide the data by target array and features arrays.
      * created a testing and training dataset.
      * used StandardScaler to scale the training and testing sets.

The target variable of interest was IS\_SUCCESSFUL.

1. Compiling, Training, and Evaluating the Model

The assignment entailed attempting to achieve a target predictive accuracy greater than 75%. I made 3 attempts to obtain this objective using neural networks and machine learning but was unsuccessful. All of my results varied around 73% accuracy, just shy of the target.

**Attempt 1**

* Achieved 72.7% accuracy
* 2 layers. Chose as a simple beginning for analysis.

1st layer: 10 neurons, relu activation function

2nd layer: 20 neurons, relu activation function

A graph with blue lines

Description automatically generated

**Attempt 2**

* Achieved 72.7% accuracy
* 3 layers. Added an additional layer with the goal of improving accuracy

1st layer: 10 neurons, relu activation function

2nd layer: 20 neurons, relu activation function

3rd layer: 30 neurons, relu activation function

A graph with blue lines

Description automatically generated

**Attempt 3**

* Achieved 72.5% accuracy
* 3 layers. Included an additional layer and also modulated the activation functions to tanh to possibly improve accuracy.

1st layer: 10 neurons, relu activation function

2nd layer: 20 neurons, tanh activation function

3rd layer: 30 neurons, tanh activation function

A graph with blue lines

Description automatically generated

**Summary**

I made 3 unsuccessful attempts to achieve the target predictive accuracy of 75%. Each subsequent attempt included attempting to tune the model by either adding more layers or changing the activation function, to no avail. In a new attempt I would use a different classification model to determine if it is more adept at determining whether applicants will be successful at achieving funds from the foundation.