Write a Report on the Neural Network Model

Analysis:

1. Overview of the analysis: Explain the purpose of this analysis.

The non-profit foundation, Alphabet Soup, seeks a tool to identify and select applicants who have the

highest likelihood of success in their ventures. To assist in this process, we will leverage machine learning

and neural networks to analyze the features in the provided dataset. Our goal is to develop a binary classification

model that predicts the success or failure of applicants who receive funding from Alphabet Soup. By using this predictive tool,

Alphabet Soup can make more informed decisions and allocate resources to applicants with the greatest potential for success.

2.Results: Using bulleted lists and images to support your answers, address the following questions:

Data Preprocessing

1. What variable(s) are the target(s) for your model?

In this analysis, the target variable is "IS\_SUCCESSFUL".

This variable serves as the primary indicator to determine whether the

funds allocated by Alphabet Soup are used effectively, making it a

critical factor in the model's predictions.

2. What variable(s) are the features for your model?

The remaining variables, excluding "EIN" and "NAME", will be used as the features

for our model. These features include:

APPLICATION\_TYPE: The type of application submitted to Alphabet Soup.

AFFILIATION: The affiliated sector or industry of the applicant.

CLASSIFICATION: The classification of the organization (e.g., government).

USE\_CASE: The intended use for the requested funding.

ORGANIZATION: The type of organization submitting the application.

STATUS: The active status of the application.

INCOME\_AMT: The classification of the applicant's income amount.

SPECIAL\_CONSIDERATIONS: Any special considerations related to the application.

ASK\_AMT: The amount of funding requested by the applicant.

3. What variable(s) should be removed from the input data because they are neither

targets nor features?

The "EIN" and "NAME" columns will be removed from the dataset, as they serve as

identification fields and are not relevant as features or targets in our model.

3. Compiling, Training, and Evaluating the Model

How many neurons, layers, and activation functions did you select for your neural network model, and why?

For the first iteration of the model, I decided to use two hidden layers.

The first layer contains 80 neurons, and the second layer has 30 neurons.

These values were chosen as a rule of thumb, where the number of neurons

in each layer is typically 2 or 3 times the number of input features.

Were you able to achieve the target model performance?

The initial model achieved an accuracy of around 73%, which is close to the

target of 75%. Although the model showed promising results, it did not reach

the desired level of performance.

What steps did you take in your attempts to increase model performance?

Adjusting the input data to ensure no irrelevant variables or outliers were

causing confusion, such as:

1.Dropping or modifying certain columns.

2.Creating more granular bins for rare occurrences in categorical columns.

3.Adjusting the number of values in each bin.

4.Experimenting with increasing the number of neurons in the hidden layers.

5.Adding more hidden layers to increase model complexity.

6.Trying different activation functions for the hidden layers.

6.Altering the number of epochs during training to improve convergence.

4. Summary

After implementing the aforementioned steps, I was still unable to achieve the

targeted 75% accuracy. One area where I encountered challenges was with dropping

or modifying columns, as the model repeatedly crashed when compiling the results.

Based on this, I hypothesize that incorporating the "NAME" column back into the

model could potentially improve classification performance and lead to better

accuracy. This column may provide useful information that helps the model

differentiate between applicants more effectively.