Thetsu Ye Min (Julia Min)

Deep Learning Challenge - Non Profit Foundation Alphabet Soup

Feb 12, 2024

**Predicting Success for Alphabet Soup Funding Application Using Deep Learning**

The goal of this analysis was to help Alphabet Soup, a nonprofit foundation, predict which applicants for funding would be successful in their ventures. By using data from over 34,000 organizations that received funding in the past, we aimed to build a model that could make accurate predictions. This would help Alphabet Soup use their resources more effectively by funding projects likely to succeed.

# RESULTS

## Data Preprocessing

1. Target Variable: The target for the model was IS\_SUCCESSFUL, which indicates if the money given to an organization was used effectively.
2. Features Variables: The features included application type, affiliation, classification, use case, organization type, status, income amount, special considerations, and the amount asked for.
3. Variables Removed: We removed EIN and NAME since they are identification details that have no impact on the success of the funding applications.

## Compiling, Training, and Evaluating the Model

1. A Neural Network model was designed with two hidden layers. The first layer had 80 neurons, and the second layer had 30 neurons, both using the ReLU activation function. The output layer used the sigmoid function to predict if an application would be successful.
2. Initially, the model did not reach the target performance of 75% accuracy. It was around 72%.
3. In order to try and improve, the following steps were adjusted to reach a 75% accuracy goal.
4. *Increased the number of neurons*
5. *Added more hidden layers*
6. *Adjusted the activation functions*
7. *Experimented with the number of epochs and batch sizes*
8. *Implemented early stopping and model checkpoints*

# SUMMARY

To conclude, the deep learning model that was built was close to meeting the goal however, it did not reach the perfect score. Finding the right architecture and parameters is challenging, despite neural networks being powerful tools for classification problems. Utilizing Random Forest Classifiers could be a good choice for this matter, given the fact that it has less sensitivity and it works well with both categorical and numerical data to provide better accuracy with less fine-tuning.