**Report on the Neural Network**

**Overview of the Analysis**

The analysis aims to build a deep learning model using TensorFlow to predict the success of charity donations for Alphabet Soup. The model uses application and classification features to determine whether a donation will be successful or not.

**Results**

Data Preprocessing

Target Variable(s): "IS\_SUCCESSFUL" column (1 for successful, 0 for unsuccessful).

Feature Variable(s): All columns except "IS\_SUCCESSFUL."

Removed Variables: "EIN" and "NAME" columns for 1st and second attempts. In addition, "SPECIAL\_CONSIDERATIONS" columns was removed for 3rd attempt.

Model Architecture

For first attempt, there were 2 hidden layers with 80, 30 neurons. And for second and third attempt, one additional layer added for increasing the accuracy, three hidden layers with 80, 30, and 10 neurons, respectively.

Activation functions: ReLU for hidden layers, Sigmoid for the output layer.

Model Performance

1st Attempt:

Accuracy: 72.57%A screenshot of a computer

Description automatically generated

2nd Attempt (Added 3rd layer, increased epochs):

Accuracy: 72.55%A screenshot of a computer program

Description automatically generated

3rd Attempt (Dropped "special\_consideration" column):

Accuracy: 72.61%A screenshot of a computer

Description automatically generated

**Summary**

The deep learning model achieved around 72-73% accuracy in predicting charity donation success. While this accuracy is reasonable, other evaluation metrics should be considered, especially for imbalanced datasets.

**Recommendation for a Different Model**

For improved interpretability and performance on tabular data, a gradient boosting algorithm like XGBoost or LightGBM could be considered. These models handle missing data efficiently, offer feature importance analysis, and are less prone to overfitting compared to deep learning models. Careful experimentation is necessary to ensure the best predictive performance for Alphabet Soup's specific needs.