Charity Donation Success (Deep Learning)

Using a dataset containing **34,299 entries** we built and optimized a neutral network to classify whether or not an application was successful with the following target: **IS_SUCCESSFUL.**

Data

Here are the features of the dataset:

- APPLICATION_TYPE
- AFFILIATION
- CLASSIFICATION
- USE_CASE
- ORGANIZATION
- STATUS
- INCOME_AMT
- SPECIAL_CONSIDERATIONS
- ASK_AMT

Here are the data cleaning actions:

- Dropping columns
- Handling value counts
- Converting and splitting

Potential variables to remove:

- SPECIAL_CONSIDERATIONS

Model

What was done with the neural network:

- Hidden layer #1:
    - 100 neurons
    - ReLU activation
    - Input dimension matching the feature count
- Hidden layer #2:
    - 50 neurons
    - ReLU activation
- Hidden layer #3:
    - 25 neurons
    - ReLU activation
- Output Layer:
    - Sigmoid activation (for binary classification)

Compilation and training:

- Loss: binary_crossentropy
- Optimizer: adam
- Metric: accuracy
- Epochs: 50
- Batch Size: 32

Analysis

Optimizations made:

- Increased neurons (+20)
- Dropout to prevent overfitting
- Extra hidden layer
- Switched "adam" with "RMSprop"

Results:

- Original model:
    - Accuracy of 0.7305
    - Loss of 0.5552
- Optimized model:
    - Accuracy of 0.7308
    - Loss of 0.5587

Potential alternative:

- Logistic regression model

Conclusion

The model successfully classified charity donation success with an accuracy over the 70% goal. Optimizations provided marginal improvements.