# **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.