

1. **Overview** of the analysis: This project sought to produce a model to predict the success of an applicant's proposal.
2. **Results:**
  - Data Preprocessing
    - The **target** for this model is the **is\_successful parameter**. This is the output that signals if the project was successful or not upon funding.
    - The **features** of the model are 'NAME', 'APPLICATION\_TYPE', 'AFFILIATION', 'CLASSIFICATION', 'USE\_CASE', 'ORGANIZATION', 'INCOME\_AMT', 'SPECIAL\_CONSIDERATIONS', 'ASK\_AMT
    - 'STATUS' was removed as whether the project is currently active still or is finished would not impact the success of a new project.
  - Compiling, Training, and Evaluating the Model
    - The model had two hidden layers with 30 neurons and 10 neurons, respectively. The addition of neurons and layers had very little impact. Using the activation function "ReLU" for the hidden layers and "Sigmoid" for the final function had the best accuracy. ReLU retains more detail so is better to use in the beginning of the model.
    - The target performance was achieved after ignoring the directions and bringing back in the NAME parameter. The NAME parameter was binned. The NAME of the organizations had the biggest impact of strategies used and brought the test data accuracy to 76.3%.
    - Changes to bin thresholds were changed for the CLASSIFICATION and APPLICATION\_TYPE features. The INCOME\_AMT was also binned. Summary statistics were gathered for the ASK\_AMT and a log function was applied to scale the feature as the data was very non-normal. Different features such as 'SPECIAL\_CONSIDERATIONS,' were removed and readded to test the impact on the model.

The number of epochs was reduced to 30 as the changes flatlined. The number of hidden layers was increased to 3 then 4. The number of neurons were

increased for each layer with up to 100 for the 1st hidden layer. These changes were fruitless and were therefore taken out to maintain efficiency.

3. **Summary:** This deep learning model has only 75% accuracy and thus is open to quite a bit of risk.