Alphabet Soup Application Machine Tool - WriteUp

Summary:

The deep learning model helps predict successfulness of candidates for the foundation based on classification between pools of applicants and apply categorical loss factors during the compilation stage. Accuracy was measured across 35 epochs, resulting in 53.4% (based on latest iteration). Losses appeared to be manageable however at 6.33.

```
268/268 - 1s - loss: 6.3699e-08 - accuracy: 0.5343 - 638ms/epoch - 2ms/step
Loss: 6.369877780798561e-08, Accuracy: 0.5343440175056458
```

Data Preprocessing:

- Target Variable: **IS_SUCCESSFUL**
- Feature Variables:
  - **Affiliation**
  - **Classification**
  - **Use Case**
  - **Organization**
  - **Status**
  - **Income_Amt**
  - **Ask_Amt**
  - **Special_Considerations**
- Unnecessary Variables:
  - **EIN**
  - **NAME**

Model Compiling, Training and Evaluation:

- Neural Network Model (final set)
  - Neurons: **80**
  - Layers:**3**
  - Activation Functions: **2**
- **While unable to achieve the target model performance, iterative changes were made in an attempt to increase accuracy. This included adding an additional, hidden layer, increasing the neurons and changing the activation for the output to leaky ReLU only to revert it back because this had no effect.**
  80 Neurons were selected to help give a drop off by 50% between each layer and end with 20 in the output layer. 3 layers were needed to accommodate this.
  Sigmoid activation applies well to the binary nature of most of the features with ReLU as a flexible option for the output