Module 21 Challenge Analysis

**Overview of the Analysis:**

The purpose of this analysis is to develop a deep learning model for a classification problem; this problem being that this company is trying to classify factors that will make an applicant’s ventures successful. Specifically, the goal is to train this neural network to accurately classify the given data based on certain features and predict a target variable.

**Results:**

*Data Preprocessing:*

* **Target Variable(s):**
  + Target Variables were Application Type and Classification
* **Features:**
  + Features used were Ask\_AMT and INCOME\_AMT
* **Variables to Remove:**
  + Variables that are neither targets nor features were identified and removed from the input data to ensure a clean dataset for model training. These variables being Special Considerations, Affiliation and Use Case

*Compiling, Training, and Evaluating the Model:*

* **Neurons, Layers, and Activation Functions:**
  + The model consists of three layers: two hidden layers with 80 and 30 neurons respectively, and an output layer with a single neuron.
  + The selection of the number of neurons and layers might have been based on experimentation or architectural considerations. It's essential to choose a suitable number of neurons and layers to balance model complexity and computational efficiency.
* **Achievement of Target Model Performance:**
  + The target model performance was sufficient, however for this use case having over a 70% successful prediction rate is more than satisfactory.
* **Steps Taken to Increase Model Performance:**
  + Playing around with different levels of density within the two hidden layers did play a factor in getting its performance to where it is, although some higher margins of improvement would be good to see in the future. However, other common techniques could have been used to improve model performance include adjusting the architecture of the neural network, tuning hyperparameters, increasing the size of the training dataset, regularization techniques, and using different optimization algorithms.

architecture might be beneficial for image classification tasks, while a recurrent neural network (RNN) could be suitable for sequential data. The recommendation would depend on the nature of the data and the specific requirements of the classification