Module 21 - Neural Networks and Deep Learning

# Background

The nonprofit foundation Alphabet Soup wants a tool that can help it select the applicants for funding with the best chance of success in their ventures. With machine learning and neural networks, the features in the provided dataset are used to create a binary classifier that can predict whether applicants will be successful if funded by Alphabet Soup.

# Data Preprocessing

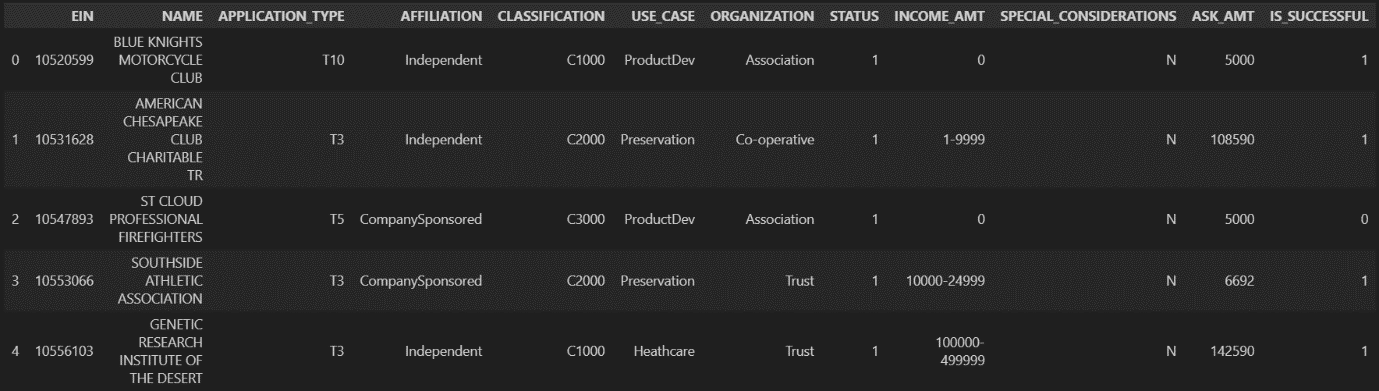
## Input data

The charity\_data csv data has the following columns, from which a DataFrame is created

|  |  |
| --- | --- |
| **Column Name** | **Description** |
| EIN | Identification column |
| NAME | Identification column |
| APPLICATION\_TYPE | Alphabet Soup application type |
| AFFILIATION | Affiliated sector of industry |
| CLASSIFICATION | Government organization classification |
| USE\_CASE | Use case for funding |
| ORGANIZATION | Organization type |
| STATUS | Active status |
| INCOME\_AMT | Income classification |
| SPECIAL\_CONSIDERATIONS | Special considerations for application |
| ASK\_AMT | Funding amount requested |
| IS\_SUCCESSFUL | Was the money used effectively |

## Features and Target

Features



REMOVE

Target

The following columns are deleted from the DataFrame as they are neither target nor feature:

* EIN
* NAME

The following columns are features:

* APPLICATION\_TYPE
* AFFILIATION
* CLASSIFICATION
* USE\_CASE
* ORGANIZATION
* STATUS
* INCOME\_AMT
* SPECIAL\_CONSIDERATIONS
* ASK\_AMT

The following column is a target:

* IS\_SUCCESSFUL

## Categorical Data

A screenshot of a computer

Description automatically generatedThe following columns contain categorical data, so they are converted into dummy variables with pd.get\_dummies():

* APPLICATION\_TYPE
* AFFILIATION
* CLASSIFICATION
* USE\_CASE
* ORGANIZATION
* INCOME\_AMT
* SPECIAL\_CONSIDERATIONS

# Compiling, Training, and Evaluating the Model

## Compiling

The neural network is structured in the following way, with 2 hidden layers and 1 output layer.

* The first hidden layer contains 80 neurons
* The second hidden layer contains 30 neurons
  + The relu activation function is used for both hidden layers.
* The output layer contains 1 neuron
  + The sigmoid activation function is used for the output layer.