

HW-21 REPORT

The report should contain the following:

1. Overview of the analysis:

1. A total of four Neural Network Models were built to predict whether applicants will be successful if funded by Alphabet Soup, a non profit foundation.

2. Results:

• Data Preprocessing

- What variable(s) are the target(s) for your model?
 - IS_SUCCESSFUL (1= YES and 0=NO) is the target variable of the model
- What variable(s) are the features for your model?
 - For binning we used CLASSIFICATION and APPLICATION_TYPE. APPLICATION_TYPE and CLASSIFICATION had more than 10 unique values and we were able to replace some with “Other” due to high fluctuation.
- What variable(s) should be removed from the input data because they are neither targets nor features?
 - It was important to remove any irrelevant information from the dataset. These include EIN and NAME. Although Name seemed to be significant and bring value after the analysis was done.

• Compiling, Training, and Evaluating the Model

- How many neurons, layers, and activation functions did you select for your neural network model, and why?
 - For the first Model (nn1) we used 3 layers, the third one using a probability activation function. The first layer had 5, the second one 3, and third one 1. The number of features dictated the number of hidden nodes. The overall accuracy for nn1 was 0.73.

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[56] # Define the model - deep neural net, i.e., the number of input features and hidden nodes for
# YOUR CODE GOES HERE

nn1 = tf.keras.models.Sequential()

# Add our first Dense layer, including the input layer
nn1.add(tf.keras.layers.Dense(units=5, activation="relu", input_dim=len(X.columns)))

# Add a second layer
nn1.add(tf.keras.layers.Dense(units=3, activation="relu"))

# Add the output layer that uses a probability activation function
nn1.add(tf.keras.layers.Dense(units=1, activation="sigmoid"))

# Check the structure of the Sequential model
nn1.summary()
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- Were you able to achieve the target model performance?
 - The target Model Performance was 75% and we were not able to achieve that. Model 1 had an accuracy of 0.73, nn2 of 0.729, nn3 of 0.56, and nn4 of 0.7293
- What steps did you take in your attempts to increase model performance? In order to attempt to improve the model performance we added more layers and nodes, but reached to the conclusion that we would probably have to bring the NAME column back to achieve the target model performance.

3. Summary:

1. Deep learning models should have different layers in order to better predict and classify information. It is also important to be sure and double check the value of certain values before dropping them. In this case, by dropping NAME, we were not able to reach the target model performance. In summary nn1 and nn4 Models had the best results overall with an accuracy of 0.73 which although close, still did not meet performance expectations. At the end of the analysis, we decided to run a Tree Base Model to compare the results and we found out that it was more accurate than the Neral Network Models with an overall accuracy of 0.76. For this reason, a Tree Base Model is a better fit for this type of analysis.