DSE 3159 DEEP LEARNING LAB

WEEK 2

Exer 1:

Using the Body Fat dataset, design a Neural Network to predict body fat. Accurate measurement of body fat is inconvenient/costly and it is desirable to have easy methods of predicting Body Fat.

The attributes are :

1. Density determined from underwater weighing
2. Percent body fat from Siri's (1956) equation
3. Age (years)
4. Weight (lbs)
5. Height (inches)
6. Neck circumference (cm)
7. Chest circumference (cm)
8. Abdomen 2 circumference (cm)
9. Hip circumference (cm)
10. Thigh circumference (cm)
11. Knee circumference (cm)
12. Ankle circumference (cm)
13. Biceps (extended) circumference (cm)
14. Forearm circumference (cm)
15. Wrist circumference (cm)

1. Perform experiments using (70,15,15) split and tabulate the performance in terms of RMSE for the following Hyper parameters :

    a. Number of Hidden Layers and Number of Units per Layer

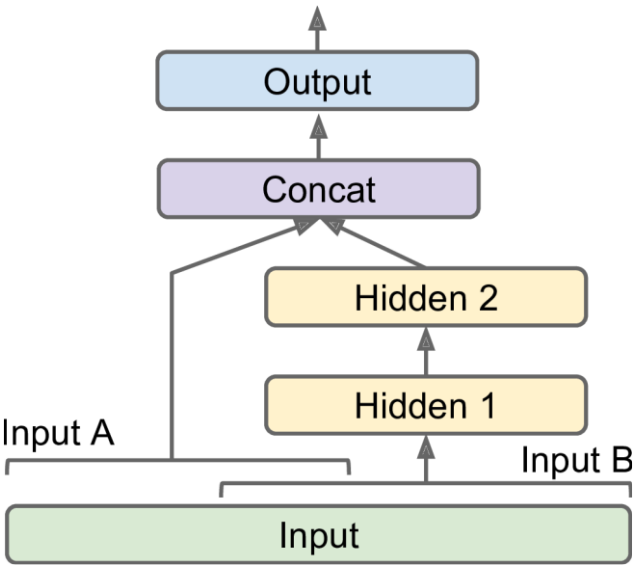
Number of Hidden Layers	Number of Units
1	128, 0 ,0
2	128, 64, 0
3	128, 64, 32

    b. Epochs (10,20,30,40)
    c. Activation function (Sigmoid /RELU)
    d. Without Regularization, with Regularization (L1/L2)
    e. Learning rate (1, 0.3, 0.1, 0.01,0.03,0.001,0.0001,0.00001)

2. Visualize the training and validation loss against the epochs and comment on optimal hyperparameters.

WEEK 5

1. Read documentation about The Keras functional API is a way to create models. https://www.tensorflow.org/guide/keras/functional
2. Using the Scikit-Learn's fetch_california_housing() function to download the California Housing Problem data.
3. Using the sequential API build a regression MLP (to make predications. Model can have 1 hidden layer with 30 units. Visualize the MSE for 20 epochs. Comment on overall accuracy.
4. Using functional API build the following Wide & Deep Neural Network with the following architecture.



Let Hidden layers contain 30 units each with ReLU activation. Pass features 0 to 4 in the wide path and features 2 to 7 into the deep path. Visualize the MSE for 20 epochs. Comment on overall accuracy.