Assignment No:1

1. Implement an MLP with 3 inputs, 2 hidden layers with 4 neurons each and an output layer with 2 neurons. Adopt the following criteria

a) Use sigmoid function in all layers.

b) Learning rate of 0.1

c) SGD with momentum optimizer=0.9

d) Loss function is MSE.

Train the MLP with 100 random samples for 10 epochs with batch size of 10.

Display the weight updates, loss and the accuracy of the model after each epoch. Plot the loss curve.

1. In the above implementation use a learning rate of 0.01 and print the loss values, accuracy and weight updates. Plot the loss curve. Explain the inference you make from the observations regrading the loss values, accuracy and weight updates.
2. In the MLP implementation described in Question No:1, use binary cross entropy (BCE) loss instead of MSE. Display the loss and accuracy for MSE and BCE. Explain and justify your observation with loss and accuracy values.
3. Given a csv file for predicting the house prices. Split the dataset as train and validation set in the ratio 80:20.
4. Train a linear regression model. Compute the MSE loss on validation data. Print the feature coefficient names and their values.
5. Train the model applying L1 (Lasso) Regularization. Compute the MSE loss on validation data. Print the feature coefficient names and their values.
6. Train the model applying L2 (Ridge) Regularization. Compute the MSE loss on validation data. Print the feature coefficient names and their values.

Explain and justify the feature coefficient values you observe for each model.

csv file source: <https://github.com/selva86/datasets/blob/master/BostonHousing.csv>

1. Implement an MLP with 3 inputs, 2 hidden layers with 8 neurons each and an output layer is scalar. ReLU activation used in hidden layers and sigmoid used in the output layer. Use adam optimizer and binary cross entropy loss. Use three parameter initialization methods like Xavier, He, Normal. Display the loss and accuracy values for each method.