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Assignment 3 Report

Task:

1. Part 1: Binary Classification using Multilayer Perceptrons
2. Part 2: Bonus Multiclass Classification using Multilayer Perceptrons

I used python 3 to implement the project. Unzip the zip file to explore it.

**Part 1: Binary Classification using Multilayer Perceptrons**

Libraries:

Used Numpy to handle arrays

Csv to read data from the files

Random to initialize weights and bias

There are 764 features and 1 class label called in the dataset. I normalized the features so that they are all between 0 and 1 by dividing by the max number in the dataset of 255. The class label is not normalized for which it is in put into another label called Y.

Architecture should be

Input Layer: 764 nodes + bias

Second Layer : 3 nodes + bias

Output Layer: 1 node

The weights and bias are randomly initalized between (-1,1).

Hyperparamters: Epochs = 1 (only used 1 because it seems to converge very quickly on any other epoch), learning rate/alpha = 0.05

Utilized the sigmoid function as our activation function. Weights and bias are updated using stochastic gradient descent.

We round our output value to the nearest integer to predict our class label due to it being binary.

Upon training and testing, the accuracy observed is about 99%

**Part 2: Bonus Multiclass Classification using Multilayer Perceptrons**

Only thing i changed from part 1 to part 2 is the amount of second layer and output layer nodes which were changed to 10+ bias and 5 respectively. Along with this, i changed the learning rate to 0.01 and upped the epochs to 5. The best training and testing accuracy observed is about 22%