Report for MNIST dataset Assignment

we are required to implement a neural network algorithm for classification of the handwritten digits

we used 10,000 sample from the dataset for training and 1,000 for testing and since its saved in a 1-dimentional array of size 784 so we will reshape it in form of 2-dimentional array with size of 28\*28 to be easily manipulated and visualized, then in feature extraction phase we used the center of mass (centroid) of each grid, and we save them in feature vector so that each number has many feature vectors but close in value so that we can compare a feature vector of a test sample with the trained ones.

We tried a lot of numbers to built an appropriate neural network to give us the highest accuracy but all of the gives us but accuracy percentage and in the end we figured out this neural network

we built a neural network with two hidden layers with 32 neural in the input layer and 16 in the first layer and 16 in the second hidden layer and 10 in the output layer with 100 epochs and 0.01 learning rate and this and this gives us the highest accuracy with 78.2%

then we try bigger learning rate 0.02 and gives us higher accuracy 80.5% and when we rise it again to 0.03 it gives us 79.9 so we stabilized with 0.02 learning rate

the we try a neural network with two hidden layers with 94 neural in the input layer and 16 in the first layer and 16 in the second hidden layer and 10 in the output layer with 100 epochs and 0.02 learning rate and this and this gives us accuracy 79.9%

the we found the highest accuracy rate was 80.5% when we use the neural network with two hidden layers with 94 neural in the input layer and 16 in the first layer and 16 in the second hidden layer and 10 in the output layer with 100 epochs and 0.02 learning rate