

Assignment-1

Neural network

In this assignment you will use and train a fully connected neural network and a CNN to classify the digits in the MNIST dataset.

1. The neural network should incorporate the following features. (Use backpropagation)
 - No. of hidden layers = 1
 - No. of neurons in the hidden layer1 = 100
 - Activation function of hidden layer: Sigmoid function
 - No. of neurons in the output layer = 10
 - Activation function in output layer: SoftMax function
 - Input: MNIST data (28*28)
2. The convolution neural network should have the following with descriptions. (LeNet model). (Use backpropagation)
 - Convolution layer 1: 5*5, with 6 output channels
 - MaxPool1: 2*2, stride=2
 - Convolution layer 2: 5*5, with 16 output channels
 - MaxPool1: 2*2, stride=2
 - Linear Layer1: input (calculate yourself based on conv and pooling layer), output=120
 - Linear Layer2: input = 120, output=84
 - Linear Layer1: input=84, output=10
 - Use ReLU as activation function in each convolution and linear layer
 - Input: MNIST data (28*28)
3. Importing the Pytorch and other library functions, using the neural network and the CNN(LeNet) mentioned in part 1 and 2, classify the digits (0-9) in an MNIST data set (28*28). Both of them should use
 - a) Stochastic Gradient Descent (SGD)
 - b) ADAM (Adaptive Momentum), for learning the weights in the fully connected layers.