

Deep Learning

Assignment2

(Neural Network)

Submission date: December 5, 2025

In this assignment you will implement a 2 layer neural network for binary classification.

Define the following functions in python

Init_parameters: given N_x , N_h , N_y , randomly initialize all the required parameters (W and b for each layer and return those parameters. Here N_x is number of input features, N_y is the number of hidden units in layer 1 and N_y is the number of output units in layer 2.

Define python functions for following activation functions: sigmoid, relu

Define function for forward pass: given the input X and parameters, compute the predicted value using the current state of parameters. Use Relu as activation function for layer 1 and sigmoid as activation function of layer 2. This function must return the computed predicted value and intermediate results required for backpropagation

Define cost function: return the cross entropy cost of training set, given the predicted output and ground truth.

Define backward pass: This function must compute and return the gradients of all the parameter given the predicted output, ground truth and intermediate results.

Define function fit: this function must implement the gradient descent for given number of epochs, features, ground truth, dimensions of the layers and learning rate. This function must utilize the function forward pass and backward pass to update the parameters.

Use the same dataset that you used for logistic regression to test your implementation. Try different dimensions of the layers of the network. Report train and test error for all the different combinations you have tried.

Note: this assignment demands the implementation of neural network from scratch