Computer Science & Information Systems

Deep Learning - Lab sheet - Module 2

Exercise 4 - Deep Neural Network with Regularization

1 Objective

The objective is to

- implement a deep neural network using Tensorflow and Keras.
- train the DNN with MNIST dataset.
- add regularization.

2 Steps to be performed

Tool Python3

Libraries required numpy, matplotlib, tensorflow, keras

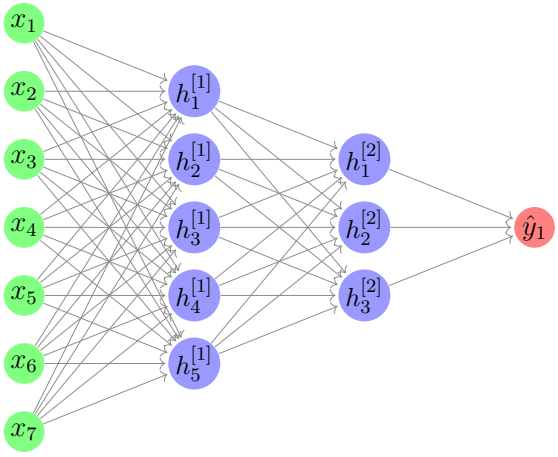
Input MNIST Dataset - Dataset of 60,000 28 × 28 grayscale images of the 10 digits, along with a test set of 10,000 images.

Deep Learning Model Deep Neural Network

Implementation 2D Deep Neural Network with L2,L1 regularization.ipynb

Steps .

- Import required Python libraries.
- Load the dataset from Keras.
- Prepare the dataset for training.
- Create the Deep neural network architecture.
- Add L2 regularization to Dense layer 2.
- Configure the model for training, by using appropriate optimizers and regularizations.
- Train the model.
- Test the model using the test set.
- Report the results.



3 Expected Results

- Report the Training and Validation accuracy and loss.

4 Observation

- The DNN with early stopping was defined, configured, trained and tested.
- The results were plotted and displayed.

5 Modifications

- Change the number of hidden units.
- Increase the number of hidden layers.
- Use a different optimizer.
- Train for more epochs.