Computer Science & Information Systems

Deep Learning - Lab sheet - Module 3

Exercise 4 - Convolutional Neural Network with L1-L2 Regularization

1 Objective

The objective is to

- implement a convolutional neural network.
- train the CNN with MNIST dataset.
- implement L1-L2 Regularization.

2 Steps to be performed

Tool Python3

Libraries required numpy, matplotlib, tensorflow, keras

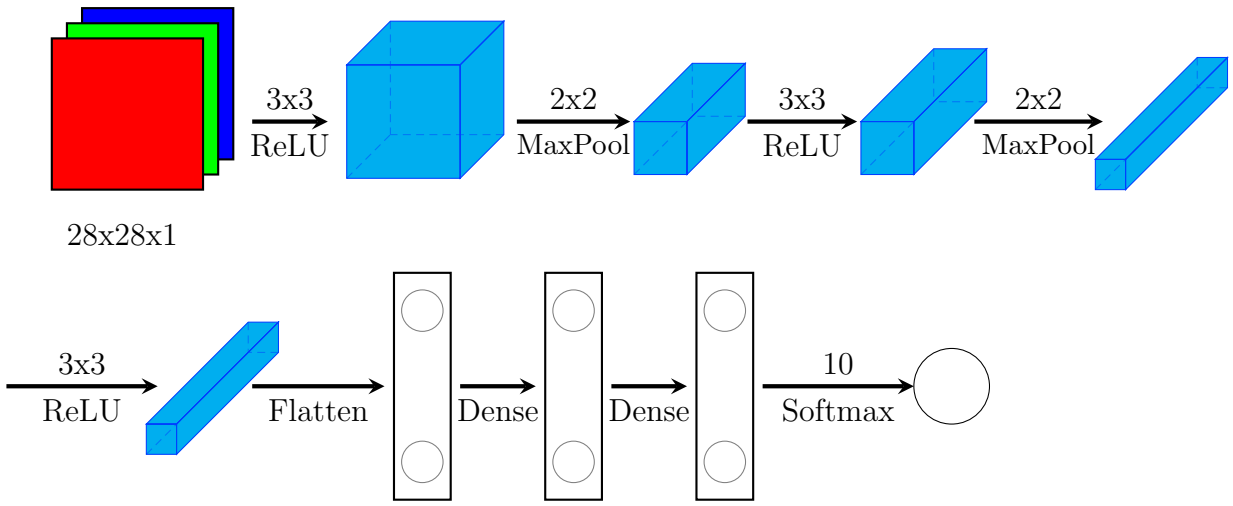
Input MNIST Dataset

Deep Learning Model Convolutional Neural Network

Implementation 3D CNN with L1-L2 Regularization.ipynb

Steps .

- Import required Python libraries.
- Load the dataset from Keras.
- Prepare the dataset for training.
- Create the Convolutional neural network architecture as in the diagram.
- Add L1-L2 with Regularizer to Convolution 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

- Plot of the Training and Validation accuracy.
- Plot of the Training and Validation loss.
- The Classification report and Confusion matrix.

4 Observation

- The CNN was defined, configured, trained and tested.
- L1-L2 Regularization was implemented.
- 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.
- Train using CIFAR dataset .