Work Integrated Learning Programmes

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Computer Science & Information Systems

Deep Learning - Lab sheet - Module 3

Exercise 1 - Convolutional Neural Network

1 Objective

The objective is to

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

2 Steps to be performed

Tool Python3

Libraries required numpy, matplotlib, tensorflow, keras

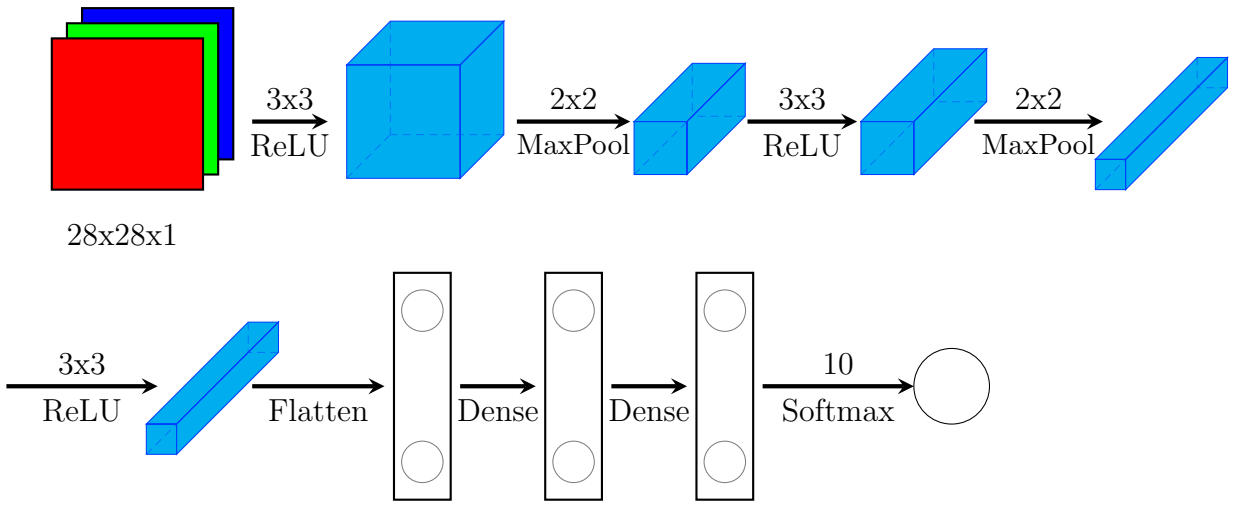
Input MNIST Dataset - Dataset of 60,000 28 × 28 grayscale images of the 10 digits, along with a test set of 10,000 images.

Deep Learning Model Convolutional Neural Network

Implementation 3A Convolution Neural Network.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.



- 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 vanilla CNN 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.
- Train using CIFAR dataset .