

## Set # C

### Experiment-1

Marks = 6.0

Design a Customized Convolutional Neural Network (CNN) for Handwritten Digit Classification with the following specifications:

- Generate a CNN model with:
  - Two CNN hidden layers (Conv2D) of sizes 32, 64 followed by
  - ReLU Activation and
  - MaxPooling2D with Kernel size (3, 3), and Stride=(1,1)
- Use Flatten Layers to convert the feature map into 1D with a Dense layer of size 64 followed by an output Dense Layer of size 10 with SoftMax Activation Function.
- Display the generated CNN with the required number of parameters.
- Use the MNIST database for training and testing.
- Adopt Data augmentation (rotation, shift) with the MNIST dataset.
- Train two CNNs using the original MNIST dataset and augmented MNIST dataset.
- Use the test MNIST dataset as well as the augmented test MNIST dataset to predict the accuracy of the two trained CNNs.
- Compare and plot the prediction accuracy of the two CNNs.

### Experiment -2

Marks = 4.0

Implement a simple deep neural network (DNN) for solving the polynomial equation  $y = 5x^3 - 10x^2 - 20x + 10$  with the following specifications:

- Use three hidden-layers of sizes 32, 64, and 128 and display the generated DNN with the required number of parameters.
- Generate training samples within the range of -20 to +20. Use an appropriate method for normalizing the training data in the range of -1 to +1.
- Use 5% of the samples as test data and 5% of the samples as validation data and the rest of the data for training the DNN with an appropriate number of epochs.
- Display the training accuracy vs validation accuracy and training error vs validation error curves.

LAB Viva Marks = 5.0