Weekly Lab Assignment – III

Course Code: CS16201/CS18223/CS22203

1. Implement a CNN using a framework like TensorFlow or PyTorch to classify images from the CIFAR-10 dataset. Start with a simple architecture with one convolutional layer, one pooling layer, and one fully connected layer.

2. Modify the CNN model from the previous question by adding additional convolutional and pooling layers. Experiment with different architectures and observe the impact on model accuracy.

3. Implement data augmentation techniques and integrate them into the training process of your CNN model. Evaluate the impact of data augmentation on model performance using the CIFAR-10 dataset.

4. Conduct hyperparameter tuning for a CNN model on a chosen dataset. Focus on optimizing parameters like the number of filters, kernel size, learning rate, and epochs. Document the process and results.

5. Compare the performance of different CNN architectures (e.g., AlexNet, VGG, ResNet) on the same image classification task. Discuss the strengths and weaknesses of each architecture.

6. Implement a simple object detection framework using CNNs. Use a dataset like PASCAL VOC for training and evaluating the model. Discuss the challenges involved in adapting CNNs from image classification to object detection.