In the name of God

Computer Vision

Faculty of mechanical engineering

1928
K. N. Toosi University of Technology

Instructor:
Dr. Esmaeil Najafi

Assignment 3

Due date: 01/03/06

For all the questions:

- Plot validation accuracy, training accuracy, training loss, and validation loss during training.
- Report precision, recall, F1-score, and confusion matrix for validation data.
- Compare results from different parts and write your conclusion.

1- Design a multi-layer perceptron network for image classification. Based on experiments and your knowledge, choose the number of layers and neurons, activations, optimizer, etc. Train your network on the CIFAR-10 dataset and evaluate your model.

2- Design a CNN with:

- one convolutional layer and only one fully connected layer as the classifier. For the convolutional layer, choose 8 filters at first and train your network on CIFAR-10 dataset. Repeat this experiment with 8×2^n filters. Where $n = 1, 2, \ldots, 6$.
- One convolutional and layer only one fully connected layer as the classifier. For the convolutional layer, choose 32 filters at first and train your network on CIFAR-10 dataset. Repeat this experiment with **n** layers. Where $n = 2, \ldots, 6$.

Plot the highest validation accuracy of each stage against the number of layers (for experiment 1) and layers (for experiment 2).

3- Train the following models once with transfer learning and once from scratch on tiny ImageNet.

- ResNet-50
- MobileNet-v2
- Inception-v3
- VGG-19
- DenseNet121
- EfficientNetB7
- Xception

For each model, choose a sample image and measure the average prediction speed of each model for 100 predictions.

Good Luck