EE 5024 Machine Learning For Image Processing (Jul-Nov 2018)

Programming Assignment 1

K – NN Classification:

Download the Datasets from moodle and experiment with K = 1, 3, 5, 9 and 11 for each of the following tasks.

Case: 1

Task	DATASET	Feature Vector To Extract	Metric To Be Used
1	MNIST	Pixels of the Image	Eucledian Distance
2	MNIST	Histogram of Image	Eucledian Distance

Compare the above mentioned tasks in terms of Accuracy and observe the variation of accuracy with K. (plot Accuracy vs. K and infer)

Case: 2

Task	DATASET	Feature Vector To Extract	Metric To Be Used
1	CIFAR 10	Histogram of Image	Eucledian Distance
2	CIFAR 10	Histogram of Image	NCC

NCC-Normalized cross correlation

Compare the above mentioned tasks in terms of Accuracy and observe the variation of accuracy with K. (plot Accuracy vs. K and infer)

You can find accuracy as:

$$Accuracy = \frac{No. \ of \ correctly \ classified \ test \ samples}{No. \ of \ test \ samples} \ x \ 100$$

MNIST Dataset:

MNIST (Modified National Institute of Standards and Technology) database is a large database for handwritten digits. Download the MNIST files that have been uploaded in moodle. For both train as well as test data the first digit in the ith row is the label (a number in the range 0-9) of the ith sample. The next 784 (28x28) digits in the same row are the values of the pixels of the sample (image). The image is stored in row-major order, so that the first 28 entries of the 784 digits are the pixel values of the first row of the image.

CIFAR10 Dataset:

Here are the classes in the dataset, as well as 10 random images from each:
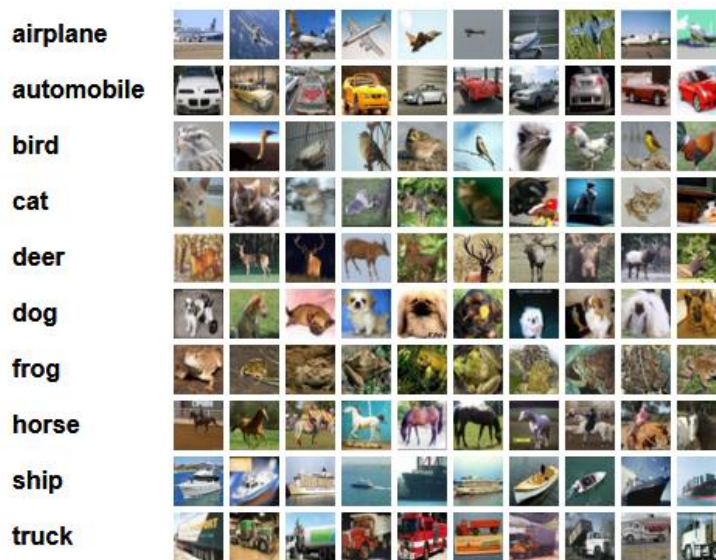
In both training as well as in test data each row stores a 32x32 color image. The first 1024 entries contain the red channel values, the next 1024 the green, and the final 1024 the blue. The image is stored in row-major order, so that the first 32 entries of the array are the red channel values of the first row of the image. When you load the training or testing data the corresponding labels will be automatically loaded.

NOTE:

Those who want to use python can load the data using scipy.io.loadmat () function.