PROJECT-2

Project submission

Due data

: 6. 13 (Sun) 21:00

How to submit

: Use LMS board

Submission

: Main report + python source code (.py file format)

: The report document should be converted to the pdf file

: All source code files are zipped into one file

: Your submission → report.pdf, code.zip

Penalty

: Late submission

→ -5pt for every 1 hour after 21:00

→ -20pt per day (5 days late submission → No points)

: Plagiarism (e.g. copying someone else's report, source code, etc.) → No points

No exception

: No exception for network, system problems

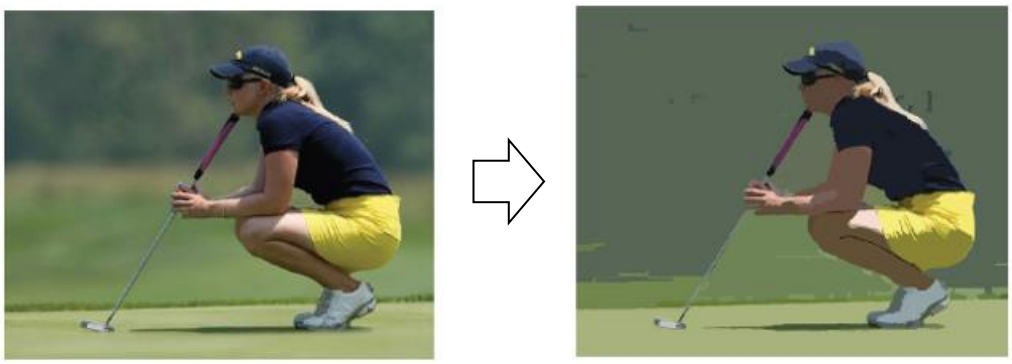
: Email me if LMS system is not working (byungoh@kau.ac.kr)

: Please check the uploaded files again by downloading and uncompressing

1. (20%) (K-means/Mean shift) Implement the followings, and analyze and compare the results.

   1) Implement the k-means and Mean shift algorithms.

   2) Cluster the image based on the (R, G, B) vector of the image, and visualize it as below.

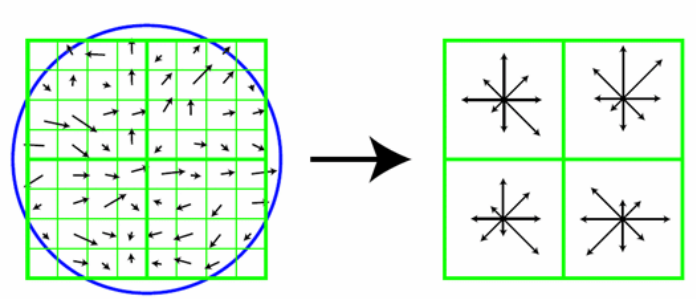


2. (50%) (Local Descriptor) Based on the descriptor designed in FL class, design the followings.

1) Apply k-means (k=10) algorithm to MNIST test dataset, where input dimension is 28^2=784.

2) Measure the clustering accuracy by counting the number of incorrectly grouped images, and analyze the results.

3) Divide the input 28×28 image into four 14×14 sub-blocks, and compute the histogram of orientations for each sub-block as below.



4) Apply k-means (k=10) algorithm again using feature, where input dimension is 8×4=32.

5) Measure the clustering accuracy for feature-based approach, and analyze the results.

3. (30%) (Back propagation) Design the simple single-layer perceptron (SLP) network for IRIS dataset.

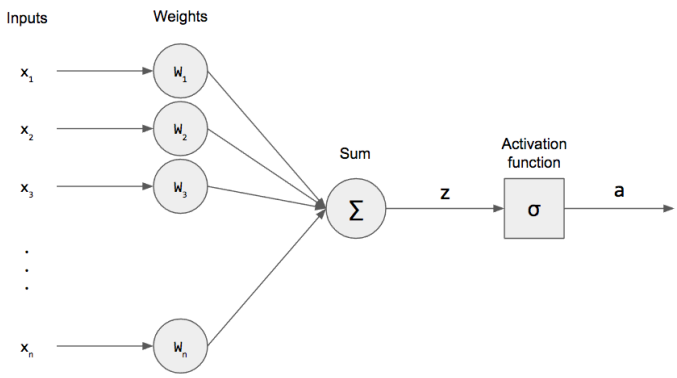
1) Use python library to extract images, and separate them into test and training set.

2) Select any two datasets for training and test.

3) Design SLP network to classify them. Use the sigmoid function for activation function.

4) Use the back propagation method to train the network parameters.

5) Compute the training and test error for every epoch.



Tip

1. DO NOT use the image library functions. (filter, conv, imnoise, …)

   Simple basic functions are allowed to use. (e.g., sin, cos, rand, randn, min, max, median, …)

   → It is highly recommended to use the library functions for comparisons.

2. Apply various options as much as possible. (e.g., varying noise energy, filter parameters, …)