Mathematical Foundations for Computer Vision and Machine Learning

Byung-Woo Hong

Computer Science Department, Chung-Ang University

Assignment 3

Jupyter Notebook

- Create a new notebook for Python 3
- Include your name and the student ID in the notebook
- Write python 3 codes for the given assignment
- Try to separate the codes into meaningful blocks
- Write a comment for each block of codes
- Plot the important intermediate results
- Write a short description for each graphical result
- Use LaTeX for mathematical comments in the notebook
- Save the notebook file as assignment03.ipynb
- Download the notebook as a PDF file assignment03.pdf

Assignment 3

github

- Start a project with the name assignment03
- Include the link to the giuhub project in the notebook
- Upload the notebook assignment03.ipynb to the project after the deadline (Note that your github project is visible to public)

Assignment 3

Submission to *eclass*

- Submit the PDF file assignment03.pdf to eclass
- Deadline is 11:59 pm on next Thursday. No extension
- Score ranges from 0 to 5

Assignment 3

Score Table

- The results should be correct
- The codes should be written in a modulated way
- The comment should be made for each block of the codes
- The important intermediate results should be presented
- The link to the github project should be included

Assignment 3

Programming Assignment: k-means algorithm

- Implement a k-means algorithm for two-dimensional points
- Generate k number of random point clusters
- Demonstrate the k-means algorithm based on the points
- k is an input variable (you pick k for the demonstration)

Assignment 3

Essential Functions: k-means algorithm

- generatePointCluster: (number of clusters, number of points)
- computeDistance: (a pair of points)
- initialiseLabel: (number of clusters)
- computeCentroid: (number of clusters)
- assignLabel: (number of clusters, list of distances)
- computeEnergy: (list of data, list of labels)

Assignment 3

Essential Visualisation: k-means algorithm

- Input data
- Initial label
- Initial centroid
- Final label
- Final centroid
- Energy per each iteration