

ASSIGNMENT-III

Computer Vision

Q1) Using SLIC super-pixels, compute the saliency map of a given image using the following formula: [1.75 marks]

$$Sal(SP_i) = \sum_{j \in \{1, \dots, |SP|\}} \|SP_i(c) - SP_j(c)\|_2 \times e^{-\left(\frac{\|SP_i(l) - SP_j(l)\|_2}{\sqrt{width^2 + height^2}}\right)}$$

where:

SP_i denotes i – th super-pixel.

$SP_i(c)$ denotes color of the i – th super-pixel.

$SP_i(l)$ denotes location of the i – th super-pixel.

$\|\cdot\|_2$ denotes L2-norm (Euclidean Distance).

e denotes the base of natural logarithm.

$|SP|$ denotes number of super-pixels.

$width$ denotes the width of the image.

$height$ denotes the height of the image.

Sal denotes the saliency value

Q2) Deriving inspiration from mean-shift & k-means algorithms for region-level segmentation, perform region-level segmentation using DBSCAN clustering algorithm for a given image. Show your results while varying different DBSCAN parameters and explain why you are getting those results.

[1.75 marks]

Q3) Study the following paper and explain in detail the improvements made over SIFT in your own words. Run their codes and compare their speeds.

[1.5 marks]

SURF: Speeded Up Robust Features, ECCV'06