

Computer Vision CSL 462/618 – Dr. Abhinav Dhall

Assignment 3 (Total Marks - 20)

Due date: 16 October 2017 11:55 PM on Moodle in a single zipped file

1. Create a Bag of words based matching/categorization solution on the MNIST-fashion database. (15 Marks)

<https://github.com/zalandoresearch/fashion-mnist/blob/master/README.md>

<https://www.kaggle.com/zalando-research/fashionmnist/data>

Use the Train and Test set images in the link above.

CreateDictionary() – computes and save the visual dictionary. Write your own clustering code. How did you choose the optimum value of the number of clusters, discuss the result in a short pdf document. (5 Marks) Please start coding well in time, this step may consume more take computation wise.

ComputeHistogram() – takes as input a feature vector and the visual dictionary matrix and generates the histogram using soft assignment (giving weight to the next nearest neighbor) (2 Marks)

MatchHistogram() – the function compares two histograms and returns the distance. PDIST2 function cannot be used. (1 Mark)

Write a script RunAll_Your_IITRPR_ID.m, which extracts features from the images and then calls the CreateDictionary() function. The most closest word to the mean of the cluster should be saved in a directory for later inspection (1 Mark). This for visualising what the dictionary words represent. Then the script calls the ComputeHistogram() function to create the histograms for all the training and Test images. MatchHistogram() then is called for the Test set images and the Label (category) for each Test image is generated by assigning the class of the nearest neighbor (in the Training set) (2 Marks). Display the overall classification accuracy, class wise accuracy, precision and recall (1 Mark).

Make sure that all the functions are in one .m file RunAll_Your_IITRPR_ID

You can use any feature. Make sure that the code of the descriptor is provided and any path are set (if required) in the RunAll_Your_IITRPR_ID.m script. The script should run simply by executing it.

The complete method should be described in a BMVC extended abstract Latex format (3 marks).

2. ComputeHomography() (5 Marks) The functions takes two images as input.

The program (.m) lets a user select four points each (in GUI) in the two images. Write your homography computation function and then use imwarp to warp. Join the two images (mosaic) into a third image and display it. Mention briefly the method in the report file.

Name of the .m file, which should contain this function - ComputeHomography_Your_IITRPR_ID.m