

ASSIGNMENT1

DIGITAL IMAGE PROCESSING (DIP) - CSE 478

DEADLINE: 19 AUGUST (WEDNESDAY)

- (1) Spot the differences between the two sets of images (given below) and write a program to automatically annotate (mark) the differences with red color bounding boxes (rectangles).
 - a.) Set1: spot1-diff1.jpg and spot1-diff2.jpg
 - b.) Set2: spot2-diff1.png and spot2-diff2.png
- (2) Implement histogram equalization and histogram matching without using inbuilt matlab functions and illustrate an example of each. Use step function and ramp function as reference histograms and compare the results (illustrate input and output histograms) on office.jpg
- (3) Find out the maker of this chip, in image “chip.jpg”. Try out various contrast enhancement techniques (at least three different intensity transforms, you can include histogram equalization as one of them) and compare the results. (Hint: For even better results you could try out combinations.)
- (4) Apply highboost filtering on the image bell.jpg, compare results by varying window sizes (for smoothing filter) and k (the weight factor). Illustrate the steps.
- (5) We discussed the edge preserving bilateral filter in the class. A detailed description with equations can be found at (https://en.wikipedia.org/wiki/Bilateral_filter). Attempt the following:
 - a.) Implement an 5×5 bilateral filter and apply it to the gray scale image “face.png” (Note: be careful in choosing the value of σ).
 - b.) The filter can be extended to color images by simply applying the filter to each color channel separately. Use the image “boy-smiling.jpg” to test color image bilateral filtering with different window sizes (5×5 , 10×10 and 15×15) and different values of σ . Comment on the effect of changing window sizes and σ .
 - c.) Does it makes sense to develop an inverse bilateral filter, which blurs an image at edges and preserves the homogenous regions. If it makes sense, design an inverse bilateral filter and suggest its applications.