Digital Image Processing MCQs by Aditya Ghodgaonkar

1. Which method of Image processing can be used for performing Steganography ?

(a) PCA (b) Bit Slicing (c) Convolution (d) Thresholding

Answer: (b) Bit Slicing - PCA is an algorithm used for feature reduction (in image processing). Whereas Thresholding and Convolution are used in De-noising and Edge Detection. Bit Slicing is used for extracting LSB (Leftmost Significant Bit) images from a given image. Which are then used for appending text ASCII code, and this can make us hide text (secret messages) in images.

2. Which type of Distribution is responsible for 'Salt & Pepper' Noise ?

(a) Gaussian (b) Poisson (c) Uniform (d) None of These

Answer: (d) None of These , as Salt & Pepper noise is caused by faulty sensor cells and occurrence of dust during Transformation of an image. Hence, it is based on Outlier distribution (does not belong to any distribution).

3. Bob is dealing with Medical Images such as X-Ray and MRI , which type of Image Transformation is likely to be used by him ?

(a) Negative *Transform* (b) Logarithmic *Transform* (c) DCT (d) Piecewise Linear *Transform*

Answer: (b) Logarithmic Transform and Exponential Transform are used for contrast adjustment of an Image, either pushing it in darker side or in lighter side.

4. Which operation could be used for converting RGB images to Grayscale image ?

(a) Fourier Transform (b) Average (c) DCT (d) LBP

Answer: (b) Average. Derive each of the channel separately, say R(Red), G(Green) and B(Blue). Now take their average , (R+G+B)/3 to get the grayscale image.

5. Which of the following is a Point Descriptors used for feature extraction ?

(a) SIFT (b) SURF (c) BRISK (d) All of These

Answer: (d) All of these, are used for feature extraction. SIFT, SURF and BRISK are different Algorithms which are used for extracting features from an image.

6. Which type of redundancy (during Image Compression) is removed by using *Transform* such as FFT and DCT ?

(a) Coding Redundancy (b) Interpixel Redundancy (c) Psycho visual Redundancy (d) All of These

Answer: (c) Psycho visual Redundancy. These are those type of redundancies in which eyes fail in figuring out difference between subsequent pixels. FFT, DCT are used for upgrading each pixel to the value of surrounding maxima pixel (pixel with maximum value).

7. In Gaussian distribution, how is the value of scale factor estimated ?

(a) using mean(μ) (b) using standard Variance(σ) (c) both (d) None of These

Answer: (b) Using Standard Variance. As the scale factor in Gaussian distribution is equals to ($1/\sqrt{2\pi}\sigma$)

8. What is the size of covariance matrix formed in intermediate steps of PCA algorithm dependent upon ?

(a) size of image (b) Number of images (c) Both (a) and (b) (d) None of These

Answer: (d) None of These. PCA algorithm is used for dimensional reduction and reducing the number of features obtained. So this algorithm is independent of size of image or number of images, rather, the size of covariance matrix depends on Total LBP vector extracted. Say, if 59 LBP vectors were extracted for a single image then a matrix of size 59X59 will represent covariance matrix for n images.

9. How many Kernels does Prewitt operator use to? (a) 2 (b) 3 (c) 4 (d) 8

Answer : (a) 2 . As Prewitt operator is used for detecting horizontal and vertical edges so for convolution of an image with a kernel of Prewitt operation one gets a choice of using 2 kernels (one in each direction).

10. Which is the right syntax for contrast Adjustment of an Image 'I' (in MATLAB).

(a) j= imadjust(I,[.3 .7] , [ ]);

(b) j= imadjust(I,[.3 .7] , [.1 .9]);

(c) Both (a) and (b)

(d) None of These

Answer : (c) Both (a) and (b). imadjust() is a function used in MATLAB to perform Image adjustment (with respect to contrast of Image). It works without secondary parameters too. Example: imadjust(I); But as per the given syntax, Transform Transform Transform Transform

j= imadjust(I,[.3 .7] , [ ]); // This will change intensities of only those pixels which come in the range of 76-178 (0.3*255 to 0.7*255) to the range 0-255. (255 is multiplicative factor because a grayscale image has a Level value of 256. So the range would be 0-255.

j= imadjust(I,[.3 .7] , [.1 .9]); This will change intensities of only those pixels which come in the range of 76-178 (0.3*255 to 0.7*255) to the range 25-230 (0.1*255 to 0.9*255).