**Image Processing - Important Questions**

## Chapter 1- Introduction to Image Processing

1. Define digital image. How do you represent a digital image in computer?
2. Explain digital image processing with suitable block diagram.
3. What do you mean by visual perception? What are the elements of visual perception? Explain.
4. Explain the adjacency and path of image pixels. Calculate the 8-ajucent and m-adjacent path from (1,3) to (3,2) for following image on v {0,1}
   0 1 1
   0 2 0
   0 0 1
5. What are the difference between digital image representation and digital image processing?
6. Explain sampling and quantization.
7. Explain how you can convert an analog image into a digital image? How many images of size 2400x1600 with 256 gray levels can be store in a 1024 MB storage space?
8. Calculate the City Block Distance (D4), Chessboard Distance (D8) and Euclidean Distance (De) of pixel p(1,2) and q(4,1)

| | | | | |
|---|---|---|---|---|
| 2 | 3 | 2 | 6 | 1 |
| 6 | 2 | 3 | 6 | 2 |
| 5 | 3 | 2 | 3 | 5 |
| 2 | 4 | 3 | 2 | 2 |
| 4 | 5 | 2 | 3 | 6 |

## Chapter-2: Image Enhancement and Filter in Spatial Domain

1. Explain the term Contrast Stretching with example.
2. What do you mean by image enhancement? What is Histogram Modeling? Explain with example.
3. Compute the histogram equalization of the given data.

| Gray Level | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| No. of Pixels | 1000 | 500 | 520 | 340 | 400 | 700 | 200 | 800 |

4. What do you mean by image enhancement? Explain the operation of Power law (Gamma) transformation with example.
5. What is boundary? Explain spatial weighted averaging filter with suitable example.
6. Write the algorithm for the implementation of median filter in spatial domain.
7. What do you mean by low pass filtering in digital image processing? Explain it with suitable example. Show how can you convert low pass filter to high pass filter with suitable block diagram.
8. What is zooming? Explain the process of zooming by interpolation method.
9. Explain the process of zooming by replication method.
10. Explain in detail the template matching using Correlation.
11. What is a gradient filter? Explain the Sobel gradient filter in detail along with its algorithm for implementation.
12. Explain the term 'Log and inverse log transformation' techniques for the purpose of image enhancement. Explain the average spatial filter along with suitable algorithm for its implementation.
13. Derive the equation for Laplacian filter and write the algorithm for its implementation.
14. Explain the first derivative filter with a suitable example.
15. Explain the Bit plane slicing technique for image enhancement.

## Chapter 3- Image Enhancement in Frequency Domain

1. Define the fourier transform. Explain the Hadamard transform with example.
2. Explain the fast fourier with example.
3. Explain in detail procedure for implementing Butterworth High Pass filter in Frequency domain.
4. Define Discrete Cosine Transform(DCT). Differentiate between Discrete Fourier Transform (DFT) and Fast Fourier Transform(FFR).

## Chapter 4- Image Restoration and Compression

1. Difference between High pass and band pass filtering
2. What is image coding? Explain the Run length coding with example.
3. Construct Huffman code for each gray level given and find the compression ratio and coding efficiency.

| Gray Level | 0 | 1 | 2 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| No. of Pixels | 30 | 35 | 38 | 15 | 10 | 38 | 80 |

4. What do you mean by image coding? Explain the process of predictive coding.
5. Explain the predictive and inter-frame coding with example.
6. What do you mean by Lossy Predictive Coding? Explain it with a suitable block diagram
7. Explain Contra-harmonic Mean Filters used for image restoration

## Chapter 5- Morphological Image Processing

1. How dilation and erosion are applied in region filling and boundary extraction
2. Explain opening and closing morphological operations in brief.

## Chapter 6- Image Segmentation

1. Explain the segmentation by thresholding. Explain how can you apply segmentation in line detection?
2. Explain in detail the region split and merge techniques for image segmentation. List the problems associated with region split and merge technique.
3. Explain in detail the region growing techniques for image segmentation. List the problems associated with region growing technique.
4. Explain Global, local, and Adaptive thresholding in segmentation.
5. How edges are detected using the gradient operators? Explain with suitable example.
6. Difference between line detection and edge detection
7. What is Hough transform? How it is useful in line detection? Explain with example.

## Chapter 7- Representations, Description and Recognition

1. What is pattern recognition? Explain the applications of neural networks in pattern recognition.
2. What is pattern and pattern recognition? Explain the steps and application areas of pattern recognition system.
3. Explain Features extraction.