

Question Bank of Digital Image Processing

1. INTRODUCTION

1. What is digital image processing, what are the various fields that use digital image processing
2. What are the components of Image processing system.
3. What are the fundamental steps in digital image processing.
4. Define Digital Image Processing
5. Give example of fields that uses Digital Image Processing
6. Define- Digital Image Processing Also give two example two example of fields that use DIP
7. Explain fundamental steps in DIP.
8. Explain Components of Image processing system
9. Explain how DIP is used in X-Ray imaging?
10. What are the two elements that are required to acquire digital images with reference to sensing

2. DIGITAL IMAGE FUNDAMENTALS

1. What is Image sampling?
2. What is gray-level resolution?
3. What are linear & non linear operations on pixel basis?
4. Is there any basic relationship between pixels and neighbors
5. Explain linear and non linear operations in DIP
6. What are the elements of visual perception?
7. Explain zooming and shrinking in digital images, how it takes place?
8. Explain the operation on Pixel basis.
9. What is quantization?
10. What is Image sensing?
11. What is Electromagnetic Spectrum?
12. Which are the components of single sensor in "Image Acquisition"
13. How piece wise linear transformation takes place?
14. What are the elements of visual perception.
15. What are Sensor strips and Sensor arrays.
16. Explain about Image sampling and quantization
17. Explain about Spatial and Gray – Level Resolution.
18. Explain about aliasing and moiré patterns.
19. Explain about linear and non-linear operations on images.
20. Explain about operations on a pixel basis.

3. IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN

1. Explain use of log in gray level transformation
2. How histogram equalization is useful in histogram processing
3. What is mean by Image Subtraction?
4. What are spatial enhancement methods?
5. Explain Histogram processing.
6. What is use of 1st and 2nd derivation enhancement?
7. What is spatial filtering?
8. Explain Local enhancement, Image averaging.
9. What are first derivatives for image enhancement? Explain.
10. Explain about Piecewise-Linear Transformations
11. Explain about :
 - (a) Histogram Processing
 - (b) Histogram Equalization
 - (c) Histogram Matching
12. Explain about Enhancement using Arithmetic/Logic operations.
13. Explain about Image subtraction, image averaging.
14. Explain about smoothing of spatial filters, smoothing of linear and order-statistics filters.
15. Explain about the gradient in combining spatial enhancement methods.
16. Explain about laplacian.

4. IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN

- 1) What is meant by Fourier transformation?
- 2) Explain correspondence between filtering in spatial & frequency domains.
- 3) What is meant by homographic filtering implementation?
- 4) Give two additional properties of 2D Fourier transformations.
- 5) Explain need for padding.
- 6) How image restoration takes place.
- 7) Explain two dimensional DFT and its inverse.
- 8) Explain one dimensional Fourier transform and its inverse.
- 9) What is smoothing.
- 10) Explain the terms-
 - i) Butterworth
 - ii) Gaussian low pass filters.
- 11) What is unsharp masking?

- 12) Write down forward transform algorithm.
- 13) Compute the inverse Fourier transform using forward transform algorithm.
- 14) Why Fourier transformation is needed? How one-D Fourier transformation takes place?
- 15) What is use of unsharp masking in image enhancement? Explain.
- 16) Write the forward transform algorithm.
- 17) Explain about One-dimensional fourier transform and its inverse
- 18) Explain about Two-dimensional DFT and its inverse
- 19) Explain about Correspondence between Filtering in the Spatial and Frequency domains
- 20) Explain about:
 - a. Smoothing and Frequency-Domain Filters
 - b. Sharpening Frequency Domain Filters
 - c. Laplacian in the Frequency domain
21. Explain about Homomorphic Filtering Implementation
22. Explain about computing the inverse fourier transform using a forward transform algorithm
23. Explain about the Convolution and Correlation Theorems
24. Explain about properties of 2-D Fourier transform
25. Explain about The Fast Fourier Transform

5. IMAGE RESTORATION

1. How noise is reduced by frequency domain filtering?
2. What is inverse filtering?
3. In filtering how mean square error is removed?
4. Why grey-level Interpolation is used?
5. Explain grey-level Interpolation.
6. Explain noise model.
7. Explain periodic noise reduction by frequency domain filtering.
8. What is degradation function?
9. What is wiener filtering?
10. How periodic noise is reduced?
11. Explain image degradation/ restoration process with the help of example
12. Explain about Spatial Filtering, Order-Statistics, Adaptive Filters
13. Explain about : Bandreject, Bandpass
14. Explain about NotchFilters
15. Explain about various filtering techniques.
16. Explain about Geometric and Spatial Transformations
17. Explain about Gray-level interpolation.

6. COLOR IMAGE PROCESSING

- 1) What is psecolor image processing?
- 2) Why smoothing & sharpening is required in processing of image?
- 3) Explain color models (RGB,CMY,HSI)

- 4) What is noise in color image?
- 5) What is color segmentation?
- 6) Explain about various color models
- 7) Explain about pseudocolor image processing.
- 8) What is intensity slicing?
- 9) What is gray level to color transformations?
- 10) What is color slicing?
- 11) Write a short note on tone and color corrections.
- 12) How to process the histogram?
- 13) Why smoothing and sharpening is important?
- 14) What is color segmentation?
- 15) Explain color edge detection.
- 16) Explain noise in color images

7. MORPHOLOGICAL IMAGE PROCESSING

- 1) Give names of basic morphological algorithms?
- 2) What are logic operations involved in binary images?
- 3) What is convex hull?
- 4) What is “bridging gap”, how it is achieved with the help of dilation?
- 5) What is Hit-or-Miss Transformation?
- 6) Write algorithm for
 - i) Convex Hull
 - ii) Thinning
 - iii) Thickening
- 7) What are the logic operations involving binary images.
- 8) Explain about dilation and erosion
- 9) Explain about Hit or Miss Transformation
- 10) Explain about Boundary Extraction Algorithm, Region Filling Algorithm.
- 11) Explain about extraction of connected components
- 12) Explain about convex hull, thickening, thinning

8. IMAGE SEGMENTATION

1. How to detect discontinuities in image segmentation?
2. Differentiate between optimal and Global thresholding.
3. What are the things included in Region Based segmentation?
4. Explain thresholding.
5. Explain Region Splitting and merging.
6. What is the use of boundary characteristics in image segmentation?
7. Explain about detection of discontinuities
8. Explain about local processing and global processing via through Hough transform

9. Explain about various ways of thresholding
10. Explain about use of boundary characteristics for histogram improvement and local thresholding
11. Explain about thresholds based on several variables
12. Explain about Region-Based Segmentation, Region Growing, Region Splitting, Merging

9. REPRESENTATION AND DESCRIPTION

- 1) What is meant by relational descriptor?
- 2) How polygonal approximations are used in image representation?
- 3) Explain the terms
 - i) Chain codes
 - ii) Fourier descriptors
 - iii) Regional descriptors
- 4) Why region-based segmentation is required?
5. Explain about:
 - a. Chain codes
 - b. Polygonal Approximations
 - c. Signatures
 - d. Boundary Segments
 - e. Skeletons
 - f. Simple Boundary Descriptors
 - g. Shape Numbers
 - h. Fourier descriptors
 - i. Statistical Moments
 - j. Simple Regional Descriptors
 - k. Topological descriptors
 - l. Relational descriptors
 1. Explain about moments of two-dimensional functions
 2. Explain use of principal components for description

Prepared By:-

1. Ms. Kavita Khobragade
2. Mr. Lalit Sonvane
3. Ms. Seema Joshi