

Code: 9A04802

B. Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

DIGITAL IMAGE PROCESSING

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Discuss about image model.
(b) Explain the following relationship between pixels:
(i) Distance measures. (ii) Connectivity.
- 2 (a) Discuss the usefulness of DCT.
(b) Explain the implementation fast Walsh transform. How it is different from FFT?
- 3 (a) Explain following image enhancement techniques:
(i) Bit plane slicing. (ii) Grey level slicing
(b) Discuss the following spatial filtering techniques:
(i) High pass filtering. (ii) High boost filtering
- 4 (a) Explain how image enhancement is done in frequency domain.
(b) How image smoothing is done in frequency domain?
- 5 Discuss in detail the concept of pseudo-color image processing.
- 6 (a) Discuss the algebraic approach of unconstrained restoration.
(b) Explain the concept of inverse filtering and what are the limitations of it?
- 7 (a) What are the applications of image segmentation?
(b) Explain about edge detection.
- 8 (a) Explain how image redundancies can be eliminated.
(b) Discuss the need for channel encoder and decoder.

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- 1 (a) What is non uniform sampling and how it is different from uniform sampling?
(b) Explain the following relationship between pixels:
 - (i) Transitive closure
 - (ii) Labeling connected components
- 2 State and prove following 2D DFT properties.
 - (i) Translation in frequency domain
 - (ii) Scaling
 - (iii) Rotation
- 3 (a) Discuss about image enhancement using histogram processing.
(b) Sketch the histograms of dark image, bright image, low contrast image and high contrast image and explain.
- 4 (a) Distinguish between enhancement in spatial domain and frequency domain.
(b) How high pass filtering is used in frequency domain for image enhancement?
- 5 Explain about different color models used in color image processing.
- 6 (a) Explain the need for image restoration.
(b) Explain about Wiener filtering
(c) Explain about interactive restoration
- 7 (a) Discuss about region based segmentation.
(b) Explain about edge formulation and its detection.
- 8 (a) Explain about objective and subjective image fidelity criterion.
(b) How psycho visual redundancy is different from other redundancies?

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- 1 (a) Discuss about image sampling and quantization.
(b) Explain the fundamental steps involved in digital image processing.
- 2 State and prove following 2D DFT properties:
(i) Periodicity
(ii) Separability
(iii) Rotation
- 3 (a) Explain following image enhancement techniques:
(i) Image negatives
(ii) Bit plane slicing
(b) Discuss the following spatial filtering techniques:
(i) Derivative filters
(ii) Median filtering
- 4 (a) Distinguish between enhancement in spatial domain and frequency domain.
(b) How image sharpening is done in frequency domain?
- 5 (a) Differentiate pseudo-color image processing and full color image processing.
(b) What is the need for color model conversion?
- 6 (a) With the help of block diagram explain about degradation model.
(b) Discuss about algebraic restoration.
- 7 (a) Explain the concept of edge linking and boundary detection.
(b) Explain the different thresholding operations used in image segmentation.
- 8 (a) What is the need for image compression?
(b) Discuss the transform domain compression with the help of block diagram.

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- 1 (a) Explain arithmetic and logic operations that can be performed on images.
(b) List the applications of image processing.
- 2 State and prove following 2D DFT properties:
 - (i) Translation in spatial domain
 - (ii) Scaling
 - (iii) Average value
- 3 Discuss following techniques for image enhancement:
 - (i) Median filtering
 - (ii) Image subtraction
 - (iii) Derivative filters
- 4 (a) Explain how image enhancement is done in frequency domain?
(b) How low pass filtering is used in frequency domain for image enhancement?
- 5 With the help of block diagram explain about full-color image processing.
- 6 (a) Explain about inverse filtering.
(b) Compute circulant matrix when length $f(x)$ is '4' and $h(x)$ is '3'.
- 7 Explain the detection of discontinuities in images in detail.
- 8 (a) Discuss the loss less predictive coding with the help of block diagram.
(b) Discuss about image compression standards.
