POLYTECHNIC, B.E/B.TECH, M.E/M.TECH, MBA, MCA & SCHOOL

Notes   *Available @*
Syllabus
Question Papers   www.binils.com
Results and Many more…

Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 50475

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Sixth/Seventh/Eighth Semester

Biomedical Engineering

EC 8093 — DIGITAL IMAGE PROCESSING

(Common to Computer Science and Engineering/Computer and Communication Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Instrumentation and Control Engineering/Mechatronics Engineering/Medical Electronics/Information Technology)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Digital Image.

2. Differentiate between image enhancement and image restoration.

3. Explain about Arithmetic mean filter.

4. Define Gaussian noise.

5. What is meant by digital image water marking?

6. Differentiate Pseudo color image processing and full color image processing.

7. Compare orthogonal and bi-orthogonal wavelets.

8. Define spatial and temporal redundancy.

9. What is the need for Compression?

10. Define brightness, hue and saturation.

PART B — (5 × 13 = 65 marks)

11. (a) Explain how Fourier transforms are useful in digital image processing and explain the properties of Fourier transform?

Or

(b) What is meant by image interpolation? Discuss about various interpolation methods.

12. (a) Define Histogram of Image. Explain the concept of Histogram Equalization technique for Image enhancement.

Or

(b) Explain image smoothing using ideal lowpass filters and Butterworth lowpass filters.

13. (a) What are the advantages of adaptive filters? Explain about adaptive median filter.

Or

(b) Explain in detail about notch filtering and describe the procedure how to apply this filtering in the frequency domain for removing periodic noise in an image?

14. (a) Explain about edge detection using gradient operator.

Or

(b) Explain about erosion and dilation operation.

15. (a) Explain how variable-length coding procedures be used to compress a histogram equalized image with 2n intensity levels.

Or

(b) Write short notes on JPEG and MPEG standards used for image compression.

PART C — (1 × 15 = 15 marks)

16. (a) Consider a grey-level $f(x, y)$ with histogram sketched figure 16(a).
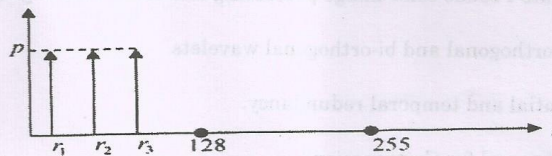

Figure 16(a)

(i)   What can we say about $f(x, y)$?   (3)

(ii) Propose an intensity transformation function which will improve the contrast of the image when it is used to modify the intensity of the image.   (3)

(iii) Sketch the histogram of the transformed intensity.   (3)

(iv) Calculate the mean and the variance of the two images.   (6)

Or

(b)   Determine the entropy and average length of the Huffman code for the image

$f(x, y) = [1\ 2\ 1\ 3\ 1\ 1\ 1;\ 0\ 0\ 0\ 2\ 3\ 0\ 0\ 0;\ 0\ 0\ 0\ 1\ 1\ 3\ 0;\ 0\ 0\ 0\ 1\ 1\ 1\ 2\ 3]$