B. Tech Odd Semester Examination, February, 2023

Electronics & Communication Engineering

(7th Semester)

Course No.: ECE-702A

(Digital Image and Video Processing)

Full Marks: 50
Pass Marks: 15

Time: 2 hours

Note:
1. Attempt any five questions.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the question.
6. All the mathematical symbols and abbreviations have their usual meanings.

1. a) What are the differences between analog and digital images?

   b) What do you mean by pixels in an image?

   c) How a pixel is identified in an image?

   d) Explain the process for converting an analog pixel value to a digital pixel value?

   2.5+2+2+3.5

2. a) In a (64 × 64) image two pixels are having co-ordinates (22, 25) and (32, 45), find their distances by Euclidean and City Block method.

   b) Explain with suitable diagram spatial and frequency representations of a (8 × 8) pixels gray image with pixel values from 0 to 255.

   2+2+3+3=10

3. a) Define histogram of an image.

b) Why histogram equalisation technique is adopted to an image?

c) Explain histogram equalisation to an image (8 × 8) with suitable example taking 0-7 pixel values. 2+1+7=10

4. a) Describe low pass and high pass spatial filtering of an image.

b) Explain taking (4 × 4) image filtered method using one kernel (G_x or G_y) bySobel operator and Laplacian operator for edge detection. 2+2+3+3=10

5. a) Explain Walsh transform of a digital image. 4

b) Illustrate discrete Fourier transform and inverse discrete Fourier transform of a digital image at least mentioning two properties. 3+3

6. a) Describe discrete cosine transform (DCT) of a digital image.

b) How DCT is used in image compression by JPEG technique. 6+4=10

7. a) What is image segmentation?

b) Write name ofthe techniques (at least three) adopted for image segmentation and edge detection?

c) What are the basic colour in an image?

d) What is the relation between RGB with HSV colour model?

e) Why colour image require more memory space than gray image? 2×5=10

8. a) How image is pictured by human eyes?

b) What is the difference of stationary image processing and video image processing?

c) How video image frames are classified?

d) Write the name (at least two) for video image compression technique.

e) Why video image processing is the most popular now? 2×5=10

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