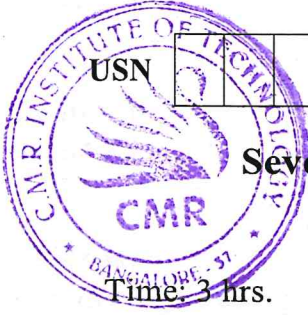


CBCS SCHEME



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17CS753

Seventh Semester B.E. Degree Examination, Jan./Feb.2021

Digital Image Processing

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. Explain the concept of sampling and quantization. (10 Marks)
- b. Explain the important relationships between pixels in a digital image. (10 Marks)

OR

- a. Describe the spatial operations that are performed on the pixel of a given image. (10 Marks)
- b. Explain the components of an image processing system with a suitable block diagram. (10 Marks)

Module-2

- a. Perform the Histogram Equalization of the following image:

$$f(x,y) = \begin{array}{|c|c|c|c|} \hline 1 & 2 & 3 & 4 \\ \hline 5 & 5 & 6 & 6 \\ \hline 6 & 7 & 6 & 6 \\ \hline 6 & 7 & 2 & 3 \\ \hline \end{array}$$

- b. Apply Histogram specification to the 8×8 , Eight level image given below:

Pixel Distribution of the image

P_k	8	10	10	2	12	16	4	2
Y_k	0	1	2	3	4	5	6	7

The target Histogram is as below:

Y_k	0	1	2	3	4	5	6	7
P_k	0	0	0	0	20	20	16	8

- a. Write note on :
 - Bit-plane slicing. (08 Marks)
 - Power law transformations. (04 Marks)
 - Log Transformations. (08 Marks)
- b. How do you characterize the spatial filters? (04 Marks)
- c. Explain the spatial filters that are used for image sharpening. (08 Marks)

Module-3

- a. Write the algorithm for frequency domain filtering. (08 Marks)
- b. Discuss the following frequency domain filters:
 - Two dimensional Ideal Low Pass filter. (12 Marks)
 - Butterworth Low Pass filters.
 - Gaussian Low pass.

OR

- 6 a. Explain homomorphic filter with procedure for applying the same. (10 Marks)
 b. Write the properties of Discrete Fourier transforms. (10 Marks)

Module-4

- 7 a. Write the formal definition of image segmentation. (06 Marks)
 b. What is an edge? Explain the edges normally encountered in image processing. Why it is important? (08 Marks)
 c. Explain the three types of Grey level discontinuities in image processing. (06 Marks)

OR

- 8 a. Explain various Gradient operators used for edge detection. (12 Marks)
 b. Discuss the following:
 (i) Marr-Hildrith operator.
 (ii) Canny Edge detector. (08 Marks)

Module-5

- 9 a. Explain the principal types of data redundancies. (10 Marks)
 b. With the block diagram, explain the general image compression system. (06 Marks)
 c. Write the differences between lossless and lossy compression. (04 Marks)

OR

- 10 Explain the following:
 a. Arithmetic coding.
 b. LZW coding.
 c. Run length coding.
 d. Huffman coding. (20 Marks)

