

R18

Code No: 157BF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 2023

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1 1.a) How to sample the image? [2]
1 b) Explain three different level processes in image processing. [3]
2 c) Differentiate between image enhancement and image restoration. [2]
2 d) Explain image negative transformation. [3]
3 e) What is restoration? [2]
3 f) Define Gaussian noise and its probability density function. [3]
4 g) Write about Dilation. [2]
4 h) How to detect a line in an image? [3]
5 i) Define spatial and temporal redundancy. [2]
5 j) Explain the concept of fidelity criteria. [3]

PART – B**(50 Marks)**

- 1 2.a) Explain about the basic steps in image Processing.
1 b) Explain Discrete Cosine Transform and specify its properties. [5+5]
OR
1 3.a) Define the following terms with respect to image:
i) Distance measure ii) Connectivity iii) Neighborhood
1 b) Derive 4×4 Haar transform. [6+4]
2 4.a) What are the techniques used for image smoothing? Explain any one spatial and one frequency techniques used for image smoothing.
2 b) State different types of point processing used for image enhancement. [5+5]
OR
2 5.a) Specify the objective of image enhancement techniques.
2 b) What is histogram equalization?
2 c) Differentiate between linear spatial filter and non-linear spatial filter. [3+4+3]

- 3 6.a) Describe with mathematical model, both constrained and unconstrained restoration.
3 b) Explain the model of image degradation process. [6+4]

OR

- 3 7.a) Describe constrained least square filtering technique for image restoration and derive its transfer function.
3 b) Write a short note on interactive restoration. [5+5]

- 4 8.a) Explain the Morphological Erosion and Dilation combination process with one example.
4 b) Discuss about Hit or Miss Transformation. [5+5]

OR

- 4 9.a) Explain any two methods for linking the edge pixels to form a boundary of an object.
4 b) Explain Region growing segmentation process in an image. [5+5]

- 5 10.a) Discuss the importance of image compression.
5 b) Explain about error free compression and lossy compression. [4+6]

OR

- 5 11.a) Write image JPEG 2000 standards.
5 b) Draw and explain a general compression system model. [4+6]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, July/August- 2022

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours

Max.Marks:75

**Answer any five questions
All questions carry equal marks**

- 1** 1.a) Explain three different level processes in image processing.
1 b) Derive the basis function of Walsh transform.
1- c) Enlist the applications of KL transform. [5+5+5]
- 1** 2.a) Discuss the image processing steps with suitable examples.
1 b) Compute Haar Transform for following N Value.
N=8. [8+7]
- 2** 3.a) Differentiate between image enhancement and image restoration.
2 b) What is the point processing? Explain about its role in image enhancement and explain different types of it. [5+10]
- 2** 4.a) Discuss how the various filter masks are generated to sharpen images in spatial filters.
2 b) With the numerical illustration explain the steps performed for Histogram processing. [8+7]
- 2** 5.a) Prove that median filter is a nonlinear filter with an example.
3 b) Explain the need for Image restoration with example. [8+7]
- 3** 6.a) Draw the degradation model and explain the different sources of degradation.
3 b) Explain linear position invariant degradation employed for image restoration. [8+7]
- 4** 7.a) Discuss segmentation using morphological watersheds.
4 b) Explain the significance of thresholding in image segmentation. [8+7]
- 5** 8.a) What are the different image compression standards? Explain.
5 b) Describe arithmetic coding with an example for compression of image. [7+8]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, February/March - 2022

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Answer Any Five Questions
All Questions carry equal marks

- 1 1.a) Explain the different fundamental steps in image processing with examples.
1 b) What is quantization in image processing? Why is it needed? What are the effects of it? [8+7]
- 1 2.a) How the Discrete Cosine Transform is used to process the digital image? Write its Kernel function.
1- b) Determine the KL transform for the following image segment. [7+8]
- 2 3.a) What is Histogram? Explain Histogram equalization with example.
2 b) What is threshold and how to choose threshold value? [7+8]
- 2 4.a) How median filter is used to remove noise in an image?
2 b) Explain how high pass filter is used to sharpen the image. [8+7]
- 3 5.a) Draw the degradation model and explain how this degradation occurs in an image.
3 b) Write about image restoration? Write some examples. [8+7]
- 3- 6.a) Design a Wiener filter for image restoration and discuss its merits and demerits.
3 b) What is meant by an interactive restoration? [7+8]
- 4 7.a) Explain a region growing method to segment an image and what are the drawbacks of this method.
4 b) What is meant by hit or miss transformation? How it is used for segmentation of an image? [7+8]
- 5 8.a) Draw the compression model and explain the function of each block.
5 b) Determine the Huffman code for the following image segment and find compression ratio with reference to binary code? [8+7]

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