

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE
[A GOVERNMENT AUTONOMOUS COLLEGE]
COE/B.TECH./CSE/CS704D/2016-17
2016
IMAGE PROCESSING

Full Marks: 70

Times: 3 Hours

The figures in the margin indicate full marks.
Candidates are requested to write their answers in their own words as far as practicable.

GROUP-A
[OBJECTIVE TYPE QUESTIONS]

Answer all questions

5x2=10

1. What is a non-linear operator? Give one example.
2. Explain image sampling and quantization with example.
3. What is spatial and gray level resolution?
4. What is image negative?
5. What is the significance of gradient direction and how is it measured?

GROUP-B
[LONG ANSWER TYPE QUESTIONS]

Answer any **four** questions

4 x 15=60

6. i) Explain Convolution and Correlation with suitable examples. Discuss their usefulness in digital image processing. 7
ii) Explain bilinear interpolation technique with mathematical expressions. 8
 7. i) What is histogram and what is meant by histogram equalization? 5
ii) How segmentation is done by region splitting and merging? 5
iii) A unit cube with vertices at (0,0,0),(0,0,1),(0,1,0),(0,1,1),(1,0,0),(1,0,1),(1,1,0),(1,1,1) is scaled using the scale factors $S_x=2, S_y=3, S_z=4$. What are the vertices of the transformed figure. 5
 8. i) Explain Dilation and Opening morphological operations. 6
ii) With diagram explain Probability Density Function of 'Gaussian noise' and 'Salt-and-pepper noise. 3+2
iii) Draw a model of image Degradation/Restoration process and explain 4
 9. i) What is the use of laplacian in image segmentation? 4
ii) Explain the digital approximation of 2D Laplacian with equation and how that equation is implemented by a suitable mask. 6
iii) What is image smoothing and image sharpening? Give examples. 5
 10. i) Explain two dimensional DFT and its inverse. 5
ii) Discuss Sobel and Prewitt methods of edge detection in digital image with corresponding 3x3 filter. 6
iii) What is meant by low pass filter in spatial domain? Give one example of such a filter and discuss the result of this process on image. 4
 11. i) Explain LoG and its application in image processing. 6
ii) What is unsharp masking and high-boost filtering? 4
iii) Define and explain mixed adjacency and D_8 distance. 5
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JALPAIGURI GOVERNMENT ENGINEERING COLLEGE
[A GOVERNMENT AUTONOMOUS COLLEGE]
COE/B.TECH./CSE/CS704B/2019-20
2019
IMAGE PROCESSING

Full Marks: 70

Times: 3 Hours

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GROUP-A
[OBJECTIVE TYPE QUESTIONS]

Answer all questions

5x2=10

1. What is digital path from pixel p to pixel q?
2. What is image enhancement?
3. What is histogram?
4. What is meant by 8-adjacency?
5. Define boundary of a region.

GROUP-B
[LONG ANSWER TYPE QUESTIONS]

Answer any **four** questions

4x15=60

6.
 - i) Explain spatial and gray level resolution. 5
 - ii) Define m-adjacency and give examples. 5
 - iii) Explain sampling and quantization with examples. 5
 7.
 - i) What is power law transformation and explain how gamma correction is important in displaying an image on a computer screen. 8
 - ii) Explain log transformation with example and diagram. 7
 8.
 - i) With suitable diagram discuss contrast stretching. 5
 - ii) Explain linear and non linear smoothing spatial filter with suitable examples. 10
 9.
 - i) Differentiate between smoothing and sharpening spatial filter.. 5
 - ii) Discuss Sobel and Prewitt methods of edge detection. 5
 - iii) What is Laplacian operator for image? 5
 10.
 - i) Any definition of first order derivative of a digital image must follow 3 rules, explain them. 5
 - ii) Derive a 3x3 mask for performing unsharp masking in single pass through an image. 5
 - iii) Explain the image gradient. 5
 11.
 - i) How second derivative is used in detecting ramp digital edge. 5
 - ii) How Hough Transform is used in edge linking. 10
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