7. Write short note on the following : 15

(a) Factors affecting image resolution.

(b) Ethical considerations involved in image and video processing tasks.

Roll No. ..... Total Pages : 04

008602

May 2024

B. Tech. (ECE) (Sixth Semester)

Digital Image and Video Processing (ECEL-606)

Time : 3 *Hours*] [*Maximum Marks :* 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Explain the difference between analog and digital images. **1.5**

(b) List the basic elements required to represent a digital image. **1.5**

(c) Recall the fundamental steps involved in histogram equalization. **1.5**

(d) How RGB color model is different from HSI color model ? **1.5**

(e) Write the formula of DFT and Inverse DFT for a 2-D image of size 64 × 64. **1.5**

(f) Describe the process of image deblurring. 1.5

(g) What do you mean by image segmentation ? Explain it with examples. 1.5

(h) Compare lossy and lossless compression techniques in digital image processing. 1.5

(i) What is the basic concept behind image restoration ? 1.5

(j) Write the Kernel of Hadamard transform for image enhancement. 1.5

Part B

2. (a) Illustrate the block diagram of Digital Image Processing, accompanied by thorough elucidation of each component. 7.5

(b) What is spatial domain filtering ? Explain the difference between low-pass and high-pass filters. How are linear and non-linear filters applied in image processing ? 7.5

3. (a) Critically analyze the role of feature extraction in image analysis tasks. 7.5

(b) Explain the concept of mask processing operation for boundary detection with the help of suitable example. 7.5

4. (a) Define image restoration. How does it differ from image enhancement ? Discuss the role of regularization techniques in image restoration. 7.5

(b) What are the key considerations for motion analysis in video processing ? Describe *two* common techniques for motion analysis. 7.5

5. (a) What is color image smoothing ? Explain how smoothing will done by neighborhood averaging and also write its algorithm. 7.5

(b) Explain the concept of color image processing. Briefly discuss the various color models used to represent color images. 7.5

6. (a) Devise a strategy to optimize the performance of a digital image compression algorithm while maintaining image quality. 7.5

(b) What is the need of compression ? Explain JPEG compression in detail. Analyze the trade-offs between compression ratio and image quality in JPEG compression. 7.5