Question Paper Code : X 20759

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Sixth Semester

Electronics and Instrumentation Engineering

IT 6005 – DIGITAL IMAGE PROCESSING

(Regulations 2013)

(Common to Biomedical Engineering, Computer Science and Engineering, Electronics and Communication Engineering, Instrumentation and Control Engineering, Mechatronics Engineering, Medical Electronics Engineering, Information Technology)

(Also common to PTIT 6005 – Digital Image Processes for B.E. (Part – Time) Electronics and Communication Engineering– Sixth Semester – Regulations 2014)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. How an image formation is modeled ?

2. State Mach band effect.

3. What is histogram ? How is it generated for an image.

4. How negative of an image is obtained ?

5. Why the restoration is called as unconstrained restoration ?

6. Define region growing.

7. What is an image pyramid ?

8. State whether the given Huffman code 0, 10, 01, 011 for the symbols a1, a2, a3, a4 is uniquely decodable or not.

9. Mention the demerits of chain code.

10. Give the formula for diameter of boundary.

PART – B **(5×13=65 Marks)**

11. a) Explain the components of image processing system. **(13)**

(OR)

b) i) Discuss the effects of non uniform sampling and quantization. **(6)**

ii) Explain how color images are represented using HSI color space model. **(7)**

12. a) Discuss about Smoothing and sharpending Spatial Filtering in detail. **(13)**

(OR)

b) Write short notes on ideal Butterworth and Gaussian Filters. **(13)**

13. a) i) How image restoration is performed using Wiener filter ? Explain. **(8)**

ii) Apply a suitable filter for the marked pixels in the image, which is corrupted by salt and pepper noise. **(5)**

$$\begin{pmatrix} 2 & 4 & 6 \\ 4 & 255 & \boxed{0} \\ 3 & \boxed{255} & 6 \end{pmatrix}$$

(OR)

b) i) Discuss the behavior of first and second order derivatives for a step and ramp edge. **(8)**

ii) How an image is segmented using region growing technique ? Explain. **(5)**

14. a) i) Discuss MPEG scheme in detail. **(6)**

ii) Obtain the Huffman code for the word 'ACCESSORIES' and determine the compression ratio. **(7)**

(OR)

b) i) Describe the various steps involved in encoding an image using JPEG standard. **(6)**

ii) Code the message 'CAB' using arithmetic coding algorithm. The probabilities are {A-0.6, B-0.3, C-0.1} **(7)**

15. a) Explain in detail any two boundary representation schemes and illustrate with examples. **(13)**

(OR)

b) Explain image recognition based on matching. **(13)**

PART – C **(1×15=15 Marks)**

16. a) Compare power required and power available in flight performance.

(OR)

b) Criticize the centre of gravity of the helicopter.

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