SEAT No. :

[5254] - 95
B.E. (Electronics)
IMAGE PROCESSING AND MACHINE VISION
(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 100*

Instructions to the candidates :

1) *Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.*
2) *Answer 3 questions from Section I and 3 questions from Section II.*
3) *Answer to the two sections should be written in separate books.*
4) *Neat diagrams must be drawn wherever necessary.*
5) *Black figures to the right indicate full marks.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) With the help of neat diagram explain the various steps in Digital Image Processing. **[8]**

b) Discuss Image formation model. Define illumination and reflectance.**[8]**

OR

Q2) a) What is an image model? Explain image sampling and Quantization in Detail. **[8]**

b) Explain image formation in human visual system. **[8]**

Q3) a) Answer the following related to histogram of an image **[8]**

i) If all pixels in an image are shuffled, will there be any change in the histogram? Justify your answer.

ii) Can two different images have different histogram? Justify your answer.

b) Discuss in detail, image enhancement in frequency domain. **[8]**

OR

P.T.O.

Q4) a) Filter the given image f(m, n) using 3×3 averaging using zero padding.**[8]**

$$F(m,n) = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 2 & 5 & 1 \\ 1 & 2 & 6 & 3 \\ 2 & 6 & 4 & 7 \end{bmatrix}$$

b) What is sharpening filter? Where it is required? **[8]**

Q5) a) Explain segmentation using thresholding. What is global threshold and local threshold? How we can select threshold value for optimum Segmentation. **[9]**

b) Write short note on **[9]**

i) Canny edge detector

ii) Chain code for boundary representations

OR

Q6) a) What are boundary descriptors? Explain Fourier descriptor in detail.**[9]**

b) With the help of suitable mask explain the following : **[9]**

i) Point detection

ii) Line detection

iii) Edge detection

SECTION - II

Q7) a) What is lossy and Lossless image compression? Give their performance parameters, applications, advantages and disadvantages. Whether JPEG standard is for lossy or lossless compression? **[10]**

b) With the help of neat block diagram explain Lossless Predictive Coding. **[8]**

OR

Q8) a) Write short note on, "Transform coding". **[9]**

b) Explain the Image Pyramid used for Multiresolution image Analysis. **[9]**

[5254] - 95   2

Q9) a) What is moments? Explain different statistical moments used for shape representation? **[8]**

b) Explain the contour based shape representation and description of an image. **[8]**

OR

Q10) a) With the help examples describe shape number for shapes of order 4,6 and 8. **[8]**

b) Explain the different algorithms of region identification. **[8]**

Q11) a) Compare Statistical and Syntactical approach for object recognition. **[8]**

b) Explain the projective ambiguity and matching constraints with reference to scene reconstruction. **[8]**

OR

Q12) a) Explain the camera model of a single perceptive camera. **[8]**

b) Explain Support Vector Machine approach for pattern recognition. **[8]**

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