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Roll No.

TCS-691

**B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER**

EXAMINATION, June, 2023

**IMAGE PROCESSING AND COMPUTER
VISION**

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among
(a), (b) and (c) in each main question.

(iii) Total marks in each main question are
twenty.

(iv) Each sub-question carries 10 marks.

1. (a) How the process segmentation is useful in object detection ? Explain the various available techniques of image segmentation in spatial domain. (CO1)

P. T. O.

(b) Give a gray scale image on paper whose physical dimension in 12.5 inch \times 12.5 inch, scanned at the rate of 300 dpi. Then calculate (i) How many bits are required to represent the image, (ii) How much time is required to transmit the image if the modem is 128 kbps, (iii) Estimate these two values if it were a binary image. (CO1)

(c) (i) Name and explain few methods or function that are available in above libraries with example.

(ii) Short notes on low level, Mid-level and High level computer vision. (CO1)

2. (a) What do you mean by the term Visual Saliency ? Explain with the help of an example. Also explain the different saliency detection algorithms used in image process. (CO2)

(b) "Structural element plays an important role for applying morphological processes." Comment on the statement. Explain four morphological operations with the help of example. (CO2)

(c) Discuss the available spatial domain and frequency domain filters for image enhancement. (CO2)

3. (a) Explain the concept and usage of OTSU thresholding in detail with the help of an example. What is the benefit of using thresholding in image processing ? (CO3)

(b) Explain the model of image degradation or restoration with suitable function. (CO3)

(c) Apply histogram stretching transformation on 8×8 , eight grey level grey image, the grey-level distribution of which is given as :

(CO3)

Grey Level (r_k)	No. of Pixel (n_k)
0	0
1	0
2	5
3	20
4	20
5	14
6	5
7	0

P. T. O.

(4)

TCS-691

4. (a) What do you mean by Edge Detection ? Explain its importance in Image Processing. (CO4)
- (b) With respect to image processing name and explain the various research areas and application of image processing in real life. (CO4)
- (c) Describe the following deep learning models : (CO4)
- (i) AlexNet
 - (ii) VGG
 - (iii) GoogleNet

5. (a) Perform histogram equalization for the following image : (CO5)

0	2	3	3
5	4	6	6
6	5	6	1
6	7	2	3

(5)

TCS-691

- (b) Suppose that the continuous intensity value in an image have the PDF function :

$$p_r(r) = \begin{cases} \frac{2r}{(L-1)^2}, & \text{for } 0 \leq r \leq L-1 \\ 0, & \text{otherwise} \end{cases}$$

Then calculate $p_s(s)$ for the above given function. (CO5)

- (c) Write short notes on the following : (CO5)
- (i) Self Drive Cars
 - (ii) Automatic Activity Recognition System
 - (iii) Anomaly Detection

TCS-691

1,640