Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code: U6E01

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Sixth Semester

Artificial Intelligence and Data Science

21UAD601 INTELLIGENCE COMPUTER VISION

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. What is computer vision, and how does it differ from traditional image processing?   CO1-U

2. Difference between brightness and Contrast.   CO1-U

3. What is the Fast Fourier Transform   CO1-U

4. Explain how smoothing helps in reducing noise in images   CO1-U

5. Define region growing?   CO1-U

6. Consider a one-dimensional image f(x) = [10 10 10 10 40 40 40 40 20 20]   CO2-App
    What is the first and second derivative? Locate the position of edge.

7. Define Huffman coding   CO1-U

8. Explain about Lossy compression?   CO1-U

9. How does recognition differ from image processing and image analysis?   CO1-U

10. What is feature extraction in the context of image recognition?   CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Find the Eigen values and the Eigen vector for the following images   CO2-App   (16)

$$\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$$

(a)   (b)

Or

(b) (i) Let the RGB values of a point is given as(0.2,0.4, 0.6) . Find the HSV   CO2-App (16)
equivalent of RGB? Also verify whether the original point can be
obtained by the inverse transform from HSV to RGB?
(ii) Determine the CIE chromaticity coordinate of a point given these
details -C1 = (0.24, 0.6, 2) and C2= (0.6, 0.8,1) . Find the third colour
C3?

12. (a) Explain the Homomorphism filtering.   CO1 - U (16)
                                        Or
    (b) Explain the inverse filtering with suitable example.   CO1 - U (16)

13. (a) For the given image,   CO2-App (16)

$$F = \begin{pmatrix} 1\,2\,3\,4\,5\,6\,7\,8 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \\ 9\,9\,9\,9\,2\,2\,2\,2 \end{pmatrix}$$

show the result of split and merge algorithm.
                                        Or
    (b) (i) For the given image, apply graph theoretic algorithm and show the   CO2-App (16)

flow of the edges. $\begin{pmatrix} 9\,7\,9 \\ 2\,4\,3 \\ 7\,5\,1 \end{pmatrix}$ (8 Marks)

(ii) Explain in detail the graph theoretic algorithm, with respect to the

following image: $\begin{matrix} 4 & 5 & 6 \\ 11 & 9 & 8 \\ 3 & 11 & 13 \end{matrix}$ (8 Marks)

14. (a) Explain about Image compression model?   CO1 - U (16)
                                        Or
    (b) Explain three categories of constant area coding in detail?   CO1 - U (16)

15. (a) Apply linear regression to the following data. Find Y values when   CO2-App (16)
        X = 4.5 and X = 6.

S.No	X	Y
1.	3	5
2.	7	8
3.	12	5
4.	16	9
5.	20	8

                                        Or

(b) An image of size 200x200 pixels and want to perform template CO2-App (16)
matching using a template of size 20x20 pixels. Assume that the
template matching process involves computing the sum of squared
differences (SSD) between the template and corresponding regions
of the image. Find the no of positions to slide and compute SSD
for each position takes 0.01 milliseconds, what is the total time
required to perform template matching?

U6E01

U6E01