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Question Paper Code: U6603

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Sixth Semester

Electronics and Communication Engineering

21UEC603-IMAGE PROCESSING & ANALYSIS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. _____ mimic the human visual system. CO1-U
(a) Computer vision (b) Computer Graphics
(c) Image processing (d) Image
2. The _____ transformation is used to compress the dynamic range of an image. CO1-U
(a) Spatial frequency (b) image Transform
(c) Frequency (d) Histogram
3. Canny edge detection algorithm is based on CO1- U
(a) Ideal model (b) step edge (c) real model (d) smoothing model
4. For the total number of 1650 test patterns, only the 65 are correctly recognized test patterns, calculate the accuracy rate. CO2- App
(a) 38.25 (b) 25.38 (c) 46.38 (d) 38.46
5. Identify the kind of learning algorithm for “facial identities for facial expressions”. CO1- U
(a) Prediction (b) Recognition patterns
(c) Recognizing anomalies (d) Generating patterns

PART – B (5 x 3= 15 Marks)

6. Write the causes of vignetting effect and how can be avoided? CO1- U
7. Describe watershed algorithm in region split and merge. CO1- U

8. Compute the Local Binary Pattern calculation for a 3×3 pixel neighbourhood CO2-App given below:

90	200	140
180	172	100
170	181	152

9. Define curse of dimensionality and how it can be eliminated. CO1- U
10. Compare linear regression and decision trees. CO1- U

PART – C (5 x 16= 80 Marks)

11. (a) Derive the expression for the image formation process in various projections. CO1- U (16)

Or

- (b) (i) Given a 3D object with coordinate points A(0, 3, 3), B(3, 3, 6), C(3, 0, 1), D(0, 0, 0). Apply the scaling parameter 2 towards X axis, 3 towards Y axis and 3 towards Z axis and obtain the new coordinates of the object. CO1- U (16)
- (ii) Given a 3D triangle with coordinate points A(3, 4, 1), B(6, 4, 2), C(5, 6, 3). Apply the reflection on the XY plane and find out the new coordinates of the object.

12. (a) How finite sequence of equally-spaced samples of a function is converted into a same-length sequence of equally-spaced samples of the discrete-time Fourier transform ? CO2-App (16)

Or

- (b) Define Histogram equalization of an image. A 3-bit image of size 4×5 is shown below. Compute the histogram equalized image. CO2-App (16)

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

13. (a) Analyze the application of region splitting and merging algorithm and analyze the segmentation algorithm which was inspired from the field of hydrology and topography. CO4-App (16)

Or

- (b) Compare and contrast LBP and LDP. Compute the Local Binary pattern texture descriptor for the 3×3 pixel neighbourhood given below: CO4-App (16)

3	5	7
2	6	4
3	8	12

14. (a) Analyze the pattern recognition problem and explain its various stages with neat diagram. CO5-App (16)

Or

- (b) Identify which method is suitable for processing the pixel data and image recognition and implement with suitable derivations. CO5-App (16)

15. (a) Consider an image containing one arbitrary object. Apply affine transformation for the following cases: CO6-Ana (16)

- i. Shearing
- ii. Scaling



Or

- (b) Consider an image containing one arbitrary object. Apply affine transformation for the following cases: CO6-Ana (16)

- i) Shearing and
- ii) Scaling



