USN | | | | | | | | | | **18EIE/ECS/EVE/ELD321**

Third Semester M.Tech. Degree Examination, Jan./Feb. 2021
Advances in Image Processing

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Explain the model of perspective projection of the 3D scene with diagram. **(10 Marks)**
     b. What are the metric and topological properties of digital images and explain it. **(10 Marks)**

OR

2   a. Starting from RGB color space, explain different color models. **(10 Marks)**
     b. What are the different noise in images and explain it. **(10 Marks)**

Module-2

3   a. Explain Gray scale transformation and also discuss for contrast enhancement using histogram equalization technique. **(10 Marks)**
     b. What is image smoothing? Write the efficient median filtering algorithm. **(10 Marks)**

OR

4   a. What are the different types of gradient operator for edge detection and explain it. **(10 Marks)**
     b. Explain local pre-processing in the frequency domain and also discuss the use of homomorphic filtering for removal of multiplicative noise. **(10 Marks)**

Module-3

5   a. With mathematical equations, explain the process of thresholding. **(06 Marks)**
     b. Explain the edge relaxation with patterns and corresponding edge types. **(08 Marks)**
     c. Write the Generalized Hough transform algorithm. **(06 Marks)**

OR

6   a. Explain the following for Region based segmentation:
        (i) Splitting and merging
        (ii) Watershed segmentation **(14 Marks)**
     b. What is optimal thresholding? Explain it. **(06 Marks)**

Module-4

7   a. Discuss the different geometric border representations. **(10 Marks)**
     b. What is Region identification? Explain Marks for region identification for 4-connectivity, 8-connectivity and label collision. **(10 Marks)**

OR

8	a.	What are scalar region descriptors? Explain it.	**(10 Marks)**
	b.	With mathematical equations, explain B-spline representation.	**(10 Marks)**

Module-5

9	a.	Mention the purpose of using morphological operations.	**(04 Marks)**
	b.	Explain four morphological principles.	**(08 Marks)**
	c.	Explain homotopic transformations for skeletons and object marking.	**(08 Marks)**

OR

10	Explain the following morphological functions:	
	(i) Dilation	**(08 Marks)**
	(ii) Erosion	**(06 Marks)**
	(iii) Hit or miss transformation	**(06 Marks)**

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