Paper id: 251008

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2024-25
IMAGE ANALYTICS

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **02 x 7 = 14**

Q no.	Question	CO	Level
a.	What are the main characteristics of a histogram in an image?	1	K1
b.	List different kind of filters.	1	K1
c.	What is the Hit-or-Miss transform used for?	1	K2
d.	Name two basic morphological algorithms and their applications.	2	K1
e.	Define pseudo color image processing.	1	K1
f.	List two preprocessing steps used for boundary detection.	4	K1
g.	What are the key components of a convolution neural network (CNN)?	5	K1

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

a.	What is morphological reconstruction? Explain its steps and applications with an example.	2	K2
b.	Define image smoothing and image sharpening. How do they differ in the context of color image processing?	1	K2
c.	List advantages of using deep learning over traditional pattern classification techniques.	5	K2
d.	What is the purpose of feature extraction in image analysis?	4	K2
e.	Discuss the working and applications of smoothing spatial filters with examples like averaging and Gaussian filters.	1	K2

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Describe image segmentation using region growing and region splitting & merging methods. Compare their efficiency.	3	K2
b.	Describe the steps involved in the Scale-Invariant Feature Transform (SIFT) algorithm. What makes it robust?	4	K3

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Compare and contrast binary morphology and grayscale morphology. Provide use cases for each.	2	K2
b.	Describe the minimum-distance classification algorithm. Derive the decision rule and illustrate with an example.	5	K3

5. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain the fundamental steps involved in a digital image processing system with a block diagram.	1	K2
b.	Explain the architecture and learning process of multilayer feed forward neural networks. How does back propagation work?	5	K3

6. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Write and explain a Python/MATLAB program to perform erosion, dilation, opening, and closing operations on a binary image.	1	K3

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b.	Explain prototype matching using 2D correlation and discuss its application in template-based recognition.	4	K3
7.	**Attempt any *one* part of the following:** 07 x 1 = 07		
a.	Discuss various types of pixel relationships and their importance in image processing.	1	K2
b.	Explain boundary representation and its significance in object recognition. What are the different techniques used?	3	K2