Nirma University

Institute of Technology

Semester End Examination (IR), February - 2022

B. Tech. in CSE / EC, Semester-VII

2ICOE03 Pattern Recognition and Image Analysis

Roll No. _____ Supervisor's initial with date: _____

Time: 2 hours Max. Marks: 50

Instructions: 1. Attempt all questions.
2. Figures to right indicate full marks.
3. Draw neat sketches wherever necessary.
4. Assume suitable data wherever necessary and clearly indicate it.

Q:1 **Answer the following.** **[20]**

[A] CO1,L4 Implement the object skeletonization algorithm with the use of morphological operations for the object shown in Fig.1. **[08]**

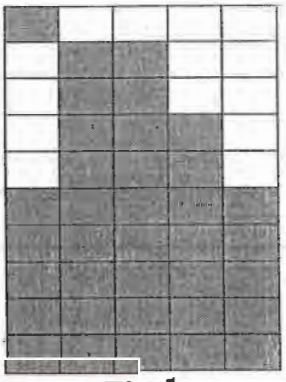

Fig.1

[B] CO1,L3 Discuss the applications of Hit-or-Miss Transform with suitable example. **[08]**

OR

[B] CO1,L3 Discuss discontinuity based image segmentation approaches for Edge detection. **[08]**

[C] CO2,L3 Discuss the applications of boundary signature feature with suitable example. **[04]**

Q:2 **Answer the following.** **[19]**

[A] CO1,L3 Discuss the applications of Morphological techniques for Boundary extraction. **[06]**

OR

[A] CO1,L3 Discuss the following spatial filtering techniques with suitable examples: **[06]**

1) Mean Filter
2) Median filter

[B] CO2,L3 Discuss the application of Polygonal approximation method by splitting the boundary with suitable example. **[05]**

[C] CO3,L2 Discuss the basic components of the convolutional neural network architecture? **[08]**

Q:3 Answer the following. **[11]**

[A] CO3,L4 Consider the dataset shown in table given below. A data sample is given to you here and you have to find whether the person has stolen or no using Naive Bayesian classification. **[05]**

Data sample X = (color=red, type=SUV, origin=domestic)

NO	COLOR	TYPE	ORIGIN	STOLEN?
1	Red	Sports	Domestic	Yes
2	Red	Sports	Domestic	No
3	Red	Sports	Domestic	Yes
4	Yellow	Sports	Domestic	No
5	Yellow	Sports	Imported	Yes
6	Yellow	SUV	Imported	No
7	Yellow	SUV	Imported	Yes
8	Yellow	SUV	Domestic	No
9	Red	SUV	Imported	No
10	Red	Sports	Imported	Yes

[B] CO3,L3 Assume that we have a binary classification problem. We have some samples belonging to two classes: YES or NO. Also, we have our own classifier which predicts a class for a given input sample. On testing our model on 165 samples, we get the confusion matrix shown below. Calculate accuracy, recall, precision, F1 score, True positive rate and False positive rate. **[06]**

	Predicted: NO	Predicted: YES
Actual: NO	50	10
Actual: YES	5	100