

Nirma University

Institute of Technology

Semester End Examination (IR), December - 2021

B. Tech. in ME / EC / CSE, 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.

[21]

[A] Consider the image shown in Fig.1. Discuss the morphological thinning operation can be implemented on the object shown in Fig.1.

[08]

CO1,L4

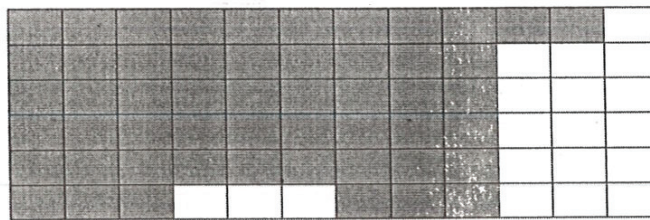


Fig.1

[B] What is chain code? Discuss the applications of chain code with suitable example. Discuss the advantages of differential chain code over simple chain code.

[08]

CO2,L3

OR

[B] Discuss following boundary based descriptors with suitable applications:
1) Fourier descriptor
2) Boundary straightness

[08]

CO2,L3

[C] Discuss discontinuity based image segmentation approaches for Point detection.

[05]

CO1,L3

Q:2 Answer the following.

[18]

[A] Discuss following region based shape descriptor along with suitable applications:

[12]

CO2,L3

(1) Euler number (2) Eccentricity (3) Elongatedness (4) Compactness

[B] What do you mean by convex hull? Consider a non-convex object in any image and discuss the method for obtaining the convex hull for that object.

[06]

CO1,L3

OR

[B] Discuss the morphological techniques for region filling operation with suitable example.

[06]

CO1,L3

Q:3 Answer the following.

[A] 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 survival chances or no using Naive Bayesian classification.

CO3,L4

Data sample X = (patient age =senior, disease=normal, sugar level=normal)

[11]

[05]

| PATIENT AGE | DISEASE | SUGAR LEVEL | SURVIVAL CHANCES |
|-------------|----------|-------------|------------------|
| Small | Serious | High | Yes |
| Medium | Normal | Low | Yes |
| Senior | Lifetime | Normal | Yes |
| Small | Lifetime | High | No |
| Small | Normal | High | Yes |
| Senior | Serious | Normal | No |
| Medium | Serious | Low | Yes |
| Senior | Normal | Low | No |
| Medium | Lifetime | Normal | Yes |
| Medium | Serious | High | No |
| Senior | Normal | Low | No |

[B] 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 180 samples, we get the confusion matrix shown below. Calculate accuracy, recall, precision, F1 score, True positive rate and False positive rate.

CO3,L3

[06]

| | Predicted: NO | Predicted: YES |
|-------------|---------------|----------------|
| Actual: NO | 55 | 15 |
| Actual: YES | 10 | 100 |