

2020

COMPUTER SCIENCE — HONOURS

Paper : DSE-A-1

(Digital Image Processing)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any five** questions : 2×5
- (a) What do you mean by image resolution?
 - (b) Mention any two goals of digital image processing.
 - (c) Write down any four storage file extensions of digital images.
 - (d) What is PSNR?
 - (e) What do you mean by a low pass filter?
 - (f) What do you understand by neighbours of a pixel?
 - (g) What do you mean by salt-and-pepper noise?
 - (h) Write down the mask for Sobel operator.
2. (a) Illustrate sampling and quantization of an image.
(b) Discuss image negative transformation. (3+3)+4
3. (a) Define histogram of an image.
(b) Discuss histogram equalization process.
(c) Explain gray level transformation function for contrast enhancement. 2+5+3
4. (a) Explain four arithmetic and logical operations on image.
(b) Mention the needs of gamma correction. (2×4)+2
5. (a) What do you understand by image enhancement?
(b) Discuss two methods of image enhancement by point processing. 2+(4×2)
6. (a) Compare image enhancement and restoration techniques.
(b) Explain about global thresholding.
(c) Differentiate uniform and non-uniform sampling and quantization. 3+4+3

Please Turn Over

7. (a) Explain min filter, max filter and mid filter.
(b) Perform the histogram stretching on a image given below with 8 intensity levels.

<i>Gray Level</i>	0	1	2	3	4	5	6	7
<i>Number of Pixel</i>	0	0	50	60	50	20	10	0

(2×3)+4

8. (a) Write down the filter masks which are used for horizontal, vertical and diagonal line detection.
(b) Explain the operation of Region Growing approach for image segmentation. 5+5
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COMPUTER SCIENCE — HONOURS

Paper : DSE-A-2

(Data Mining and Its Application)

Full Marks : 50

The figures in the margin indicate full marks.

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as far as practicable.*

Answer **question no. 1** and **any four** questions from the rest.

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| 1. | Answer any five questions : | 2×5 |
| | (a) What do you mean by Clustering? | |
| | (b) Explain different data mining tasks. | |
| | (c) Define : Regression. | |
| | (d) What do you mean by outlier detection? | |
| | (e) How can you check the efficiency of a classifier model? | |
| | (f) What do you mean by predictive modeling? | |
| | (g) Differentiate between OLTP and OLAP. | |
| | (h) What is a ROC graph? | |
| 2. | (a) Explain the various stages in knowledge discovery process. | |
| | (b) Describe Classification as a two-step process. | 5+5 |
| 3. | (a) Why is Data Cleaning required? | |
| | (b) What is a data cube? | |
| | (c) Explain the concept of Principal Component Analysis. | 3+2+5 |
| 4. | (a) Discuss the need of human intervention in the data mining process. | |
| | (b) How concept hierarchies are used for data discretization? | |
| | (c) What do you mean by Data scrubbing tools? | 4+4+2 |
| 5. | (a) Distinguish between Unsupervised and Supervised Learning. | |
| | (b) Briefly outline the major steps of decision tree classification. | 5+5 |

Please Turn Over

6. (a) What is fact table?
(b) Discuss about K-Means algorithm.
(c) Write on different applications of K-means algorithm. 2+5+3
7. (a) What is the usability of data compression?
(b) What is Neural Network? Explain activation function.
(c) What are the different methods of feature selection? 4+4+2
8. (a) What are the four major features of Data Warehouse?
(b) Differentiate between star schema and snowflake schema.
(c) Explain over fitting. 4+4+2
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