U. G. 6th Semester Examination 2022

B.C.A. (Honours)

Paper Code : DSE-3

[CBCS]

Full Marks : 32 Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Digital Image Processing

Group - A

Answer any ***six*** questions. 2×6=12

1. (a) Explain histogram equalization.
   (b) Write down the difference between lossless and lossy image compression.
   (c) What do you mean by image negative?
   (d) List edge detection operators.
   (e) Explain chess-board distance matrix.
   (f) What is image translation and scaling?
   (g) What do you mean by grey level?

Group - B

Answer any ***two*** questions. 10×2=20

2. (a) Explain basic concepts of image sampling and quantization.
   (b) Explain low pass filter in spatial domain with suitable example. 4+6=10
3. (a) What are the differences between convolution and correlation?
   (b) Short note on Edge detection.
   (c) What is iterative thresholding? 4+4+2=10
4. (a) Explain grey level slicing in point processing with suitable example.
   (b) Describe Bit-plane slicing in brief. 5+5=10

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[P.T.O.]

Introduction to Data Science

Group - A

Answer any ***six*** questions from question no.1 2×6=12

1. (a) What is R2 score?

   (b) "Gini impurity is better than information gain while constructing decision tree"- Justify.

   (c) Briefly explain data encoding using example.

   (d) What is Specificity?

   (e) Differentiate between supervised and unsupervised learning.

   (f) "A correlation of 0.9 is considered a good correlation." – Justify.

   (g) Explain array slicing using NumPy.

Group - B

Answer any ***two*** questions. 10×2=20

2. (a) Given the following data of transactions at a shop, calculate the support and confidence values of milk $\rightarrow$ bananas, milk $\rightarrow$ chocolate and chocolate $\rightarrow$ bananas.

Transactions	Items in basket
T1	milk, bananas, chocolate
T2	milk, chocolate
T3	milk, bananas
T4	chocolate
T5	bananas, chocolate
T6	milk, chocolate

   (b) What is meant by dimensionality reduction? Differentiate between feature selection and feature extraction. 3+3+4=10

3. (a) Fit a Simple Linear Regression model for the following dataset.

Internal Marks	15	23	18	23	24	22	22	19	16	19	24	11	24	16	23
Final Marks	49	63	54	60	58	61	60	63	58	60	64	30	59	49	68

   (b) Explain the disadvantages of decision tree. 7+3=10

4. (a) Explain Decision tree with suitable example.

   (b) Explain scatter plot with example. 7+3=10

Soft Computing

Group - A

1. Answer any ***six*** questions : 2×6=12

   (a) Differentiate between fuzzy set and crisp set.

   (b) When de-fuzzification is required?

   (c) What is a Fuzzy Inference System (FIS)?

   (d) Explain "Sigmoid" activation function briefly.

   (e) How to measure cardinality of a fuzzy set?

   (f) What is Lambda cut?

   (g) What is the role of bias in ANN?

Group - B

Answer any ***two*** questions. 10×2=20

2. (a) Differentiate between Artificial Intelligence and Soft Computing.

   (b) Explain the role of Backpropagation Algorithm.

   (c) State whether the following statement is true or false with proper justification
   "De Morgan's law does not apply to fuzzy sets." 4+3+3=10

3. (a) Solve OR gate using perceptron.

   (b) Differentiate between Adaline and Madaline networks. 5+5=10

4. Write short notes on any *two* : 5×2=10

   (a) Regularization technique in ANN.

   (b) Fuzzy Rule based system .

   (c) Fuzzy Controller.

   (d) Hebbian learning method.
