TE(IT) Sem VI 'C' Scheme IP QPCode: 94281 (1)

University of Mumbai

Examinations summer 2022

Time: 2 hour 30 minutes | Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	_____ is not a lossless compression algorithm
Option A:	Huffman coding
Option B:	Arithmetic coding
Option C:	Dictionary based coding
Option D:	Vector quantization
2.	Operations on single pixels of a digital image are known as _____.
Option A:	Point Operation
Option B:	Diagonal Pixel Operation
Option C:	Value Transformation
Option D:	Neighbours pixel Operation
3.	_____ filter works best to remove salt and pepper noise.
Option A:	Low pass
Option B:	High pass
Option C:	Median
Option D:	Max
4.	In _____ technique an entire sequence of source symbol is assigned a single code.
Option A:	Arithmetic Coding
Option B:	LZW Coding
Option C:	Huffman Coding
Option D:	Run-length Coding
5.	Three basic types of discontinuities are _____
Option A:	Lines, Edges, Planes
Option B:	Points, Lines, Planes
Option C:	Edges, Lines, Points

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Option D:	Point, Planes, Edges
6.	The starting pixel of region growing process is called
Option A:	base pixel
Option B:	seed pixel
Option C:	original pixel
Option D:	image pixel
7.	_____ is the foremost step in Image Processing.
Option A:	Morphological Processing
Option B:	Image acquisition
Option C:	Segmentation
Option D:	Compression
8.	_____ is not a property of 2D Discrete Fourier Transform.
Option A:	Separability
Option B:	Real
Option C:	Periodicity
Option D:	Conjugate
9.	_____ is not a region based segmentation technique.
Option A:	Region growing
Option B:	Split and merge
Option C:	Region thinning
Option D:	Region splitting
10.	_____ is a horizontal line detection mask.
Option A:	[2 -1 -1; -1 2 -1; -1 -1 2]
Option B:	[1 2 -1; -1 2 -1; 1 2 -1]
Option C:	[-1 -1 2; -1 2 -1; 2 -1 -1]
Option D:	[-1 -1 -1; 2 2 2; -1 -1 -1]

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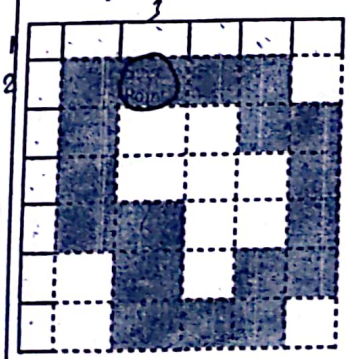
Q.2		Solve any Four out of Six. [5 Marks Each]	Marks
	A	List and define types of distance measures.	5
	B	Draw the different steps in digital image processing.	5
	C	Show transform matrix for N=4 and Give three properties each: (i) Discrete Walsh Transform (ii) Discrete Cosine Transform	5
	D	Draw a block diagram showing processing of Homomorphic Filtering and explain the method.	5
	E	Explain in brief Hough Transform.	5
	F	Give a DFT Transform matrix and Apply it to find transformed coefficients for $f(x) = \{2, 1, 3, 1\}$.	5
Q.3		**Solve any Two Questions out of Three.** **[10 Marks Each]**	
	A	Perform histogram equalization for the following pixel distribution: Gray Level: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 Frequency: 10 | 0 | 4 | 15 | 25 | 6 | 0 | 4 Draw original histogram and equalized histogram.	10
	B	Explain following morphological methods with example: (i) Erosion $A \ominus B$ (ii) Dilation $A \oplus B$	10
	C	Illustrate Arithmetic Coding and Decoding.	10
Q.4		**Solve any Two Questions out of Three.** **[10 Marks Each]**	
	A	List all Point Processing Techniques and explain any two with examples.	10
	B	Obtain the four directional Chain Code and Shape number representation using 4-directional with the given starting point as shown in the image with dark filled cell as pixel is the boundary of the object. 	10

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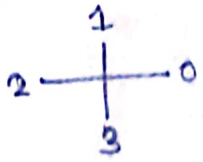
	C	List all region based segmentation techniques. Apply region based segmentation on a 3-bit image of size 4x4. Assume Threshold = 3, a pixel value 7 as starting point, and use 4-way connectivity.	10

1	0	2	0
0	0	6	6
5	5	5	5
7	6	6	0



Consider seed point as 5

XX***

0 < 3

5-7

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