



BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Science (Honours) in Computer Science

Course Name – Image Processing

Course Code - BCS501B

Semester / Year - Semester V

Time allotted : 85 Minutes

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 70=70

1. *(Answer any Seventy)*

(i) Which of the following step deals with tools for extracting image components those are useful in the representation and description of shape?

- | | |
|-----------------|---------------------------------|
| a) Segmentation | b) Representation & description |
| c) Compression | d) Morphological processing |

(ii) In which step of the processing, assigning a label (e.g., “vehicle”) to an object based on its descriptors is done?

- | | |
|-----------------------|---------------------------------|
| a) Object recognition | b) Morphological processing |
| c) Segmentation | d) Representation & description |

(iii) What role does the segmentation play in image processing?

- | | |
|--|---|
| a) Deals with extracting attributes that result in some quantitative information of interest | b) Deals with techniques for reducing the storage required saving an image, or the bandwidth required transmitting it |
| c) Deals with partitioning an image into its constituent parts or objects | d) Deals with property in which images are subdivided successively into smaller regions |

(iv) Wavelength of visible green ranges from

- | | |
|--------------|--------------|
| a) 0.52-0.70 | b) 0.52-0.62 |
| c) 0.53-0.60 | d) 0.52-0.60 |

(v) In which step of processing, the images are subdivided successively into smaller regions?

- a) Image enhancement
- b) Image acquisition
- c) Segmentation
- d) Wavelets

(vi) What is the next step in image processing after compression?

- a) Wavelets
- b) Segmentation
- c) Representation and description
- d) Morphological processing

(vii) What is the step that is performed before color image processing in image processing?

- a) Wavelets and multi resolution processing
- b) Image enhancement
- c) Image restoration
- d) Image acquisition

(viii) How many number of steps are involved in image processing?

- a) 10
- b) 9
- c) 11
- d) 12

(ix) The major area of imaging in visual spectrum is in ____.

- a) automated visual inspection
- b) auto visual inspection
- c) visual inspection
- d) automated inspection

(x) Detecting anomalies is a major theme of _____.

- a) lithography
- b) astronomy
- c) industrial inspection
- d) medicine inspection

(xi) Which is the image processing related field?

- a) medicines
- b) chemistry
- c) neurobiology
- d) chemicals

(xii) Manufactured goods often checked using _____

- a) voice over IP
- b) digital image processing
- c) audio processing
- d) video processing

(xiii) Remote sensing is an application of ___.

- a) gamma rays
- b) x-rays
- c) visible and infrared
- d) ultraviolet

(xiv) Which is the first fundamental step in image processing?

- a) filtration
- b) image acquisition
- c) image enhancement
- d) image restoration

(xv) Fluorescing area shine against dark background to permit ___.

- a) detection
- b) correction
- c) inspection
- d) enhancement

(xvi) Image processing is important in which of the following fields?

- a) Satellite Image
- b) Clinical image
- c) Cartographic mapping
- d) All of these

(xvii) Finished goods often checked using _____

- a) voice over IP
- b) digital image processing
- c) audio processing
- d) video processing

(xviii) The first Step of image processing is _____.

- a) filtration
- b) image acquisition
- c) image enhancement
- d) image restoration

(xix) To convert a continuous image $f(x, y)$ to digital form, we have to sample the function in _____.

- a) Coordinates
- b) Amplitude
- c) All of these
- d) None of these

(xx) How many bits are available for a pixel in a color image?

- a) 24
- b) 8
- c) 16
- d) 22

(xxi) In a dark image, the components of histogram are concentrated on which side of the grey scale?

- a) High
- b) Medium
- c) Low
- d) Evenly distributed

(xxii) In _____ image we notice that the components of histogram are concentrated on the high side on intensity scale.

- a) Bright
- b) Dark
- c) Colorful
- d) All of these

(xxiii) If 8 bits are available, how many intensity level will be supported?

- a) 7
- b) 256
- c) 8
- d) None of these

(xxiv) How a continuous sensed data is converted into Digital form?

- a) Sampling
- b) Quantization
- c) Both Sampling and Quantization is used
- d) Neither Sampling nor Quantization

(xxv) What is the maximum gray level in 8 bits?

- a) 8
- b) 256
- c) 32
- d) None of these

(xxvi) The resulting image of sampling and quantization is considered a matrix of real numbers. By what name(s) the element of this matrix array is called _____.

- a) Image element or Picture element
- b) Pixel or Pel
- c) All of the mentioned
- d) None of the mentioned

(xxvii) The digitization process i.e. the digital image has M rows and N columns, requires decisions about values for M, N, and for the number, L, of gray levels allowed for each pixel. The value M and N have to be:

- a) M and N have to be positive integer
- b) M and N have to be negative integer
- c) M have to be negative and N have to be positive integer
- d) M have to be positive and N have to be negative integer

(xxviii) The digitization process i.e. the digital image has M rows and N columns, requires decisions about values for M, N, and for the number, L, of max gray levels. There are no requirements on M and N, other than that M and N have to be positive integer. However, the number of gray levels typically is _____.

- a) An integer power of 2 i.e. $L = 2^k$
- b) A Real power of 2 i.e. $L = 2^k$
- c) Two times the integer value i.e. $L = 2k$
- d) None of these

(xxix) Applying Box filter we get _____.

- a) A sharpen picture
- b) Blur picture
- c) Inverted Image
- d) None of these

(xxx) An image whose gray-levels span a significant portion of gray scale have _____ dynamic range while an image with dull, washed out gray look have _____ dynamic range.

- a) Low and High respectively
- b) High and Low respectively
- c) Both have High dynamic range, irrespective of gray levels span significance on gray scale
- d) Both have Low dynamic range, irrespective of gray levels span significance on gray scale

(xxxii) Electromagnetic waves can be visualized as a _____.

- a) Sine wave
- b) Cosine wave
- c) Tangential wave
- d) None of these

(xxxii) Of the following, _____ has the maximum frequency.

- a) UV Rays
- b) Gamma Rays
- c) Microwaves
- d) Radio Waves

(xxxiii) Contrast enhancement method is related to which of the following?

- a) Frequency domain Method.
- b) Spatial domain method
- c) Neighborhood method
- d) None of these

(xxxiv) What is the unit of compactness of a region?

- a) Meter
- b) Meter²
- c) No units
- d) Meter⁻¹

(xxxv) The inverse transformation from s back to r is denoted as:

- a) $s=T^{-1}(r)$ for $0 \leq s \leq 1$
- b) $r=T^{-1}(s)$ for $0 \leq r \leq 1$
- c) $r=T^{-1}(s)$ for $0 \leq s \leq 1$
- d) $r=T^{-1}(s)$ for $0 \leq r \leq 1$

(xxxvi) The output of a smoothing, linear spatial filtering is a _____ of the pixels contained in the neighbourhood of the filter mask.

- a) Sum
- b) Product
- c) Average
- d) Dot product

(xxxvii) What is the undesirable side effect of Averaging filters?

- a) No side effects
- b) Blurred image
- c) Blurred edges
- d) Loss of sharp transitions

(xxxviii) Impulse noise in Order-statistic filter is also called as _____.

- a) Median noise
- b) Bilinear noise
- c) Salt and pepper noise
- d) None of these

(xxxix) Which of the following is best suited for salt-and-pepper noise elimination?

- a) Average filter
- b) Box filter
- c) Max filter
- d) Median filter

(xl) What is the process of moving a filter mask over the image and computing the sum of products at each location?

- a) Convolution
- b) Correlation
- c) Linear spatial filtering
- d) Non linear spatial filtering

(xli) A filter that passes low frequencies is _____.

- a) Band pass filter
- b) High pass filter
- c) Low pass filter
- d) None of these

(xlii) Among the following image processing techniques, which is fast, precise and flexible?

- a) Optical
- b) Digital
- c) Electronic
- d) Photographic

(xliii) Pick the colour attribute that describes a pure colour.

- a) Saturation
- b) Hue
- c) Brightness
- d) Intensity

(xliv) If gray values are 4 then the value of power is ____ .

- a) 2
- b) 4
- c) 6
- d) 8

(xlv) What is the tool used in tasks such as zooming, shrinking, rotating, etc.?

- a) Sampling
- b) Interpolation
- c) Filters
- d) None of these

(xlvi) Which mathematical tool is used on the pixels in sharpening the image?

- a) Integration
- b) Average

c) Median

d) Differentiation

(xlvi) _____ tool is used in tasks such as zooming, shrinking, rotating, etc.

a) Sampling

b) Interpolation

c) Filters

d) None of these

(xlviii) Electronic printing process requires _____.

a) Image Sharpening

b) Image restoration

c) Image filtering

d) None of these

(xlix) In which of the following cases, we wouldn't worry about the behaviour of sharpening filter?

a) Flat segments

b) Step discontinuities

c) Ramp discontinuities

d) Slow varying gray values

(l) Which of the following is not a valid response when we apply a second derivative?

a) Zero response at onset of gray level step

b) Nonzero response at onset of gray level step

c) Zero response at flat segments

d) Nonzero response along the ramps

(li) How will appear the edges generated by first order derivatives when compared to that of second order derivatives?

a) Finer

b) Equal

c) Thicker

d) Independent

(lii) Sharpening is analogous to which of the following operations?

a) To spatial integration

b) To spatial differentiation

c) All of these

d) None of these

(liii) Which of the following is true about the first order derivative of a digital

function?

- a) Must be nonzero in the areas of constant grey values
- b) Must be zero at the onset of a gray-level step or ramp discontinuities
- c) Must be nonzero along the gray-level ramps
- d) None of these

(liv) The first order derivative $\frac{df}{dx} = \underline{\hspace{2cm}}$ of a one-dimensional function $f(x)$?

- a) $f(x+1) - f(x)$
- b) $f(x+1) + f(x-1) - 2f(x)$
- c) All of the mentioned depending upon the time when partial derivative will be dealt along two spatial axes
- d) None of these

(lv) The second order derivative $\frac{d^2f}{dx^2} = \underline{\hspace{2cm}}$ of a one-dimensional function $f(x)$?

- a) $f(x+1) - f(x)$
- b) $f(x+1) + f(x-1) - 2f(x)$
- c) All of the mentioned depending upon the time when partial derivative will be dealt along two spatial axes
- d) None of these

(lvi) Choose the right statement after comparing between first order derivative and second order derivative of an image on the response obtained by encountering an isolated noise point in the image?

- a) First order derivative has a stronger response than a second order
- b) Second order derivative has a stronger response than a first order
- c) Both enhances the same and so the response is the same for both first and second order derivative
- d) None of these

(lvii) The principal reason behind the sharpening spatial filters is/are to

- a) Highlight fine detail in an image
- b) Enhance detail that has been blurred because of some error

- c) Enhance detail that has been blurred because of some natural effect of some method of image acquisition
- d) All of these

(lviii) Sharpening is equal to which of the following operations?

- a) To spatial integration
- b) To spatial differentiation
- c) All of these
- d) None of these

(lix) Which of the following fact(s) is/are true about sharpening spatial filters using digital differentiation?

- a) Sharpening spatial filter response is proportional to the discontinuity of the image at the point where the derivative operation is applied
- b) Sharpening spatial filters enhances edges and discontinuities like noise
- c) Sharpening spatial filters deemphasizes areas that have slowly varying gray-level values
- d) All of these

(lx) How can Sharpening be achieved?

- a) Pixel averaging
- b) Slicing
- c) Correlation
- d) None of these

(lxi) What does Image Differentiation de-emphasize?

- a) Pixel Density
- b) Contours
- c) Areas with slowly varying intensities
- d) None of these

(lxii) Which of the following is a second-order derivative operator?

- a) Histogram
- b) Laplacian
- c) Gaussian
- d) None of these

(lxiii) Dark characteristics in an image are better solved using _____.

- a) Laplacian Transform
- b) Gaussian Transform

c) Histogram Specification

d) Power-law Transformation

(lxiv) What is the smallest possible value of a gradient image?

a) e

b) 1

c) 0

d) $-e$

(lxv) Which of the following fails to work on dark intensity distributions?

a) Laplacian Transform

b) Gaussian Transform

c) Histogram Equalization

d) Power-law Transformation

(lxvi) Low frequencies are passed by _____.

a) Band pass filter

b) High pass filter

c) Low pass filter

d) None of these

(lxvii) Among the following image processing techniques which is fast, precise and flexible?

a) Optical

b) Digital

c) Electronic

d) Photographic

(lxviii) An image is considered to be a function of $a(x,y)$, where 'a' represents _____.

a) Height of image

b) Width of image

c) Amplitude of image

d) Resolution of image

(lxix) How is image formation in the eye different from that in a photographic camera?

a) No difference

b) Variable focal length

c) Varying distance between lens and imaging plane

d) Fixed focal length

(lxx) The innermost membrane of the human eye is _____.

a) Blind Spot

c) Choroid

b) Sclera

d) Retina