SNS COLLEGE OF ENGINEERING

AN AUTONOMOUS INSTITUTION

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UNIT – 3

IMAGE COMPRESSION AND IMAGE SEGMENTATION

1. **The primary purpose of image compression is to:** a) Enhance image contrast
   b) Reduce the storage space and bandwidth required for images
   c) Improve image quality
   d) Increase the number of colors in an image
   Answer: b) Reduce the storage space and bandwidth required for images
2. **Which of the following is a lossless compression technique?** a) JPEG
   b) Huffman Coding
   c) Transform Coding
   d) Wavelet Coding
   Answer: b) Huffman Coding
3. **Run-length coding is most effective on images that contain:** a) High noise levels
   b) Many distinct colors
   c) Large uniform areas of the same color
   d) Complex textures
   Answer: c) Large uniform areas of the same color
4. **Which of the following is a key characteristic of lossy compression?** a) No data is lost during compression
   b) Some image details are permanently lost to reduce file size
   c) The compressed image is identical to the original
   d) The compression process is reversible
   Answer: b) Some image details are permanently lost to reduce file size
5. **Transform coding is often used in image compression because it:** a) Preserves all original image data
   b) Converts image data into a frequency domain for easier compression
   c) Applies compression directly in the spatial domain
   d) Is a simple, lossless method
   Answer: b) Converts image data into a frequency domain for easier compression

6. **Wavelet coding is particularly useful for:** a) Compressing text documents
   b) Lossless image compression
   c) Multi-resolution image representation
   d) Increasing image brightness
   Answer: c) Multi-resolution image representation
7. **Which coding method is based on the probability of occurrence of symbols?** a) Run-length coding
   b) Huffman coding
   c) Transform coding
   d) Region coding
   Answer: b) Huffman coding
8. **In image segmentation, region growing is a method that:** a) Divides the image into regions by splitting and merging
   b) Starts with a seed point and adds neighboring pixels based on similarity
   c) Detects edges and isolated points
   d) Uses compression techniques to merge regions
   Answer: b) Starts with a seed point and adds neighboring pixels based on similarity
9. **The purpose of edge detection in image segmentation is to:** a) Smooth the image
   b) Compress the image
   c) Identify the boundaries of objects
   d) Merge regions of the image
   Answer: c) Identify the boundaries of objects
10. **Huffman coding assigns shorter codes to:**
    a) Less frequent symbols
    b) More frequent symbols
    c) Symbols with higher values
    d) Symbols with lower values
    Answer: b) More frequent symbols
11. **Arithmetic coding differs from Huffman coding in that it:** a) Uses fixed-length codes
    b) Represents the entire message as a single number
    c) Is only applicable to lossy compression
    d) Is more suitable for images with large uniform areas
    Answer: b) Represents the entire message as a single number
12. **Region splitting and merging in segmentation is based on:**
    a) Edge detection
    b) Noise reduction
    c) Homogeneity criteria
    d) Compression techniques
    Answer: c) Homogeneity criteria
13. **Which of the following is NOT a basic edge detection technique?** a) Sobel operator
    b) Prewitt operator
    c) Run-length coding
    d) Canny edge detector
    Answer: c) Run-length coding
14. **In lossy compression, which transform is commonly used to reduce the size of image files?** a) Fourier Transform

b) Discrete Cosine Transform (DCT)
c) Laplace Transform
d) Run-length Transform
Answer: b) Discrete Cosine Transform (DCT)

15. **The detection of isolated points in an image is typically used to:** a) Enhance image resolution
b) Identify small features or noise
c) Compress the image
d) Detect object boundaries
Answer: b) Identify small features or noise
16. **Run-length coding is a type of compression where:** a) Data is split into fixed-length codes
b) Repeated values are stored as a single value and count
c) Symbols are encoded based on their frequency
d) Image data is transformed into the frequency domain
Answer: b) Repeated values are stored as a single value and count
17. **The region-based segmentation method "region splitting" involves:** a) Combining adjacent regions with similar properties
b) Dividing an image into smaller regions based on homogeneity
c) Enhancing the edges of regions
d) Compressing the image using wavelet coding
Answer: b) Dividing an image into smaller regions based on homogeneity
18. **In lossy compression, the term "quantization" refers to:** a) The process of grouping similar pixel values
b) The exact representation of image data
c) The technique used to encode symbols
d) The process of reducing the precision of pixel values
Answer: d) The process of reducing the precision of pixel values
19. **Edge models in image segmentation are used to:** a) Determine pixel intensity
b) Define the boundaries of objects in an image
c) Compress the image
d) Enhance the overall contrast
Answer: b) Define the boundaries of objects in an image
20. **Arithmetic coding is particularly advantageous for images with:** a) High-frequency noise
b) Low entropy
c) Highly repetitive patterns
d) Uniform pixel intensity
Answer: c) Highly repetitive patterns

Fill-in-the-Blanks

1. **The process of reducing the number of bits needed to represent an image is known as _____.**
Answer: Image compression

2. **_____ coding is a lossless compression method that assigns variable-length codes to symbols based on their frequency.**
   Answer: Huffman
3. **Run-length coding is most effective when an image has _____ areas of the same color.**
   Answer: Large uniform
4. **Lossy compression techniques, such as JPEG, typically use the _____ transform to reduce file size.**
   Answer: Discrete Cosine (DCT)
5. **In image segmentation, _____ detection is used to identify the boundaries of objects.**
   Answer: Edge
6. **In arithmetic coding, the entire message is represented as a single _____.**
   Answer: Number
7. **Region growing in image segmentation starts from a _____ point and expands based on pixel similarity.**
   Answer: Seed
8. **_____ coding is a compression technique that reduces data by storing the frequency of repeated values.**
   Answer: Run-length
9. **Wavelet coding is often used in image compression for its ability to represent an image at multiple _____ levels.**
   Answer: Resolution
10. **The method of combining adjacent regions in an image that share similar properties is known as region _____.**
    Answer: Merging
11. **_____ coding is a lossless compression method that represents the data with a single value and count for repeated symbols.**
    Answer: Run-length
12. **In region-based segmentation, _____ refers to dividing an image into smaller regions based on homogeneity.**
    Answer: Splitting
13. **Edge detection techniques are crucial for identifying _____ in an image.**
    Answer: Boundaries
14. **Lossy compression techniques, such as transform coding, often result in some loss of _____.**
    Answer: Image quality
15. **_____ is a region-based segmentation method where regions are divided and then recombined based on similarity.**
    Answer: Region splitting and merging
16. **The process of reducing pixel value precision in lossy compression is known as _____.**
    Answer: Quantization
17. **_____ coding is used to efficiently compress images with high redundancy by encoding frequently occurring symbols with shorter codes.**
    Answer: Huffman

18. **In image segmentation, _____ models are used to define the boundaries between different regions of an image.**
    Answer: Edge
19. **Region-based segmentation methods, such as _____, analyze the entire image to determine regions with similar characteristics.**
    Answer: Region growing
20. **In transform coding, image data is converted into the _____ domain to facilitate compression.**
    Answer: Frequency