Multiple Choice Questions & Answers

1. What is the primary goal of using inverse filtering in image restoration?

A. To increase image brightness

B. To reverse the degradation process to restore the original image

C. To apply spatial filters

D. To convert images to grayscale

Answer: B. To reverse the degradation process to restore the original image

Explanation: Inverse filtering aims to reverse the degradation process in image restoration to recover the original image from the degraded version.

2. What is the main advantage of least mean square (LMS) filters in image processing?

A. They increase image resolution

B. They provide optimal restoration without any errors

C. They adapt to changing environments and minimize errors over time

D. They convert images to binary format

Answer: C. They adapt to changing environments and minimize errors over time

Explanation: LMS filters in image processing adapt to changing environments and minimize errors over time, making them suitable for applications where the characteristics of the image or the environment may vary.

3. How does constrained least squares restoration differ from standard least squares restoration?

A. Constrained least squares restoration applies additional filters for noise reduction

B. Constrained least squares restoration does not involve optimization techniques

C. Constrained least squares restoration incorporates additional constraints to improve restoration accuracy

D. Constrained least squares restoration ignores noise in the image

Answer: C. Constrained least squares restoration incorporates additional constraints to improve restoration accuracy

Explanation: Constrained least squares restoration differs from standard least squares restoration by incorporating additional constraints to improve restoration accuracy, such as enforcing smoothness or preserving certain features.

4. What is the primary advantage of interactive restoration techniques?

A. They eliminate the need for human intervention

B. They provide automatic and quick restoration of images

C. They allow users to interactively guide the restoration process based on their expertise and preferences

D. They increase image resolution

Answer: C. They allow users to interactively guide the restoration process based on their expertise and preferences

Explanation: Interactive restoration techniques enable users to interactively guide the restoration process based on their expertise and preferences, allowing for more customized and refined results.

5. How does image segmentation contribute to object detection in images?

A. By converting images to binary format

B. By applying spatial filters

C. By identifying and separating objects or regions of interest

D. By increasing image brightness

Answer: C. By identifying and separating objects or regions of interest

Explanation: Image segmentation contributes to object detection in images by identifying and separating objects or regions of interest, facilitating further analysis or processing tasks.

6. What role does thresholding play in image segmentation?

A. Thresholding enhances image color

B. Thresholding increases image resolution

C. Thresholding converts images to grayscale

D. Thresholding separates regions of interest from the background based on intensity levels

Answer: D. Thresholding separates regions of interest from the background based on intensity levels

Explanation: Thresholding in image segmentation separates regions of interest from the background based on intensity levels, simplifying the segmentation process.

7. How does edge linking contribute to boundary detection in images?

A. By converting images to binary format

B. By enhancing image brightness

C. By connecting edge points to form continuous boundaries

D. By applying color filters

Answer: C. By connecting edge points to form continuous boundaries

Explanation: Edge linking in boundary detection connects edge points to form continuous boundaries, providing a more complete representation of object boundaries in the image.

8. What is the primary purpose of region-oriented segmentation techniques?

A. To increase image resolution

B. To convert images to grayscale

C. To group pixels into meaningful regions based on similarity criteria

D. To apply frequency domain filtering

Answer: C. To group pixels into meaningful regions based on similarity criteria

Explanation: The primary purpose of region-oriented segmentation techniques is to group pixels into meaningful regions based on similarity criteria, facilitating object identification and analysis.

9. How do redundancies affect image compression?

A. They increase image resolution

B. They decrease the amount of information that needs to be stored or transmitted

C. They apply color enhancement

D. They convert images to binary format

Answer: B. They decrease the amount of information that needs to be stored or transmitted

Explanation: Redundancies in images decrease the amount of information that needs to be stored or transmitted, making compression more efficient.

10. What are fidelity criteria used for in image compression?

A. To increase image brightness

B. To measure the quality of the compressed image compared to the original

C. To convert images to grayscale

D. To apply spatial filtering

Answer: B. To measure the quality of the compressed image compared to the original

Explanation: Fidelity criteria in image compression are used to measure the quality of the compressed image compared to the original, ensuring that compression does not significantly degrade image quality.

11. How do source encoders and decoders contribute to image compression?

A. By increasing image resolution

B. By converting images to grayscale

C. By encoding and decoding image data for efficient storage or transmission

D. By applying frequency domain filtering

Answer: C. By encoding and decoding image data for efficient storage or transmission

Explanation: Source encoders and decoders contribute to image compression by encoding and decoding image data for efficient storage or transmission, reducing the amount of data required to represent the image.

12. What distinguishes error-free compression from lossy compression?

A. Error-free compression increases color depth

B. Error-free compression preserves all information from the original image without any loss

C. Error-free compression applies spatial filters

D. Error-free compression converts images to binary format

Answer: B. Error-free compression preserves all information from the original image without any loss

Explanation: Error-free compression preserves all information from the original image without any loss, while lossy compression sacrifices some information to achieve higher compression ratios.

13. How does thresholding relate to image compression?

A. Thresholding increases image resolution

B. Thresholding converts images to binary format

C. Thresholding enhances image color

D. Thresholding separates regions of interest for selective compression

Answer: D. Thresholding separates regions of interest for selective compression

Explanation: Thresholding in image compression separates regions of interest for selective compression, focusing compression efforts on the most relevant parts of the image.

14. What is the main function of the Laplacian pyramid in image compression?

A. To increase image brightness

B. To apply spatial filters

C. To provide a multi-resolution representation of the image

D. To convert images to grayscale

Answer: C. To provide a multi-resolution representation of the image

Explanation: The main function of the Laplacian pyramid in image compression is to provide a multi-resolution representation of the image, facilitating efficient compression by capturing details at different scales.

15. Why is the concept of entropy important in image compression?

A. It increases image resolution

B. It measures the amount of information in the image and helps optimize compression algorithms

C. It applies color enhancement

D. It converts images to binary format

Answer: B. It measures the amount of information in the image and helps optimize compression algorithms

Explanation: The concept of entropy is important in image compression as it measures the amount of information in the image, helping to optimize compression algorithms by identifying and exploiting redundancies effectively.

16. How does run-length encoding contribute to image compression?

A. By increasing image resolution

B. By converting images to grayscale

C. By encoding sequences of repeated values to reduce redundancy

D. By applying frequency domain filtering

Answer: C. By encoding sequences of repeated values to reduce redundancy

Explanation: Run-length encoding contributes to image compression by encoding sequences of repeated values to reduce redundancy, effectively representing long sequences with shorter codes.

17. What is the role of Huffman coding in image compression?

A. To increase image brightness

B. To convert images to binary format

C. To encode variable-length codes based on the frequency of occurrence of symbols

D. To apply spatial filtering

Answer: C. To encode variable-length codes based on the frequency of occurrence of symbols

Explanation: Huffman coding in image compression encodes variable-length codes based on the frequency of occurrence of symbols, achieving efficient representation by assigning shorter codes to more frequent symbols.

18. How does transform coding contribute to image compression?

A. By increasing image resolution

B. By converting images to grayscale

C. By transforming the image data into a domain where compression is more efficient

D. By applying frequency domain filtering

Answer: C. By transforming the image data into a domain where compression is more efficient

Explanation: Transform coding in image compression contributes by transforming the image data into a domain where compression is more efficient, such as the frequency domain, before encoding and compression.

19. What distinguishes lossy compression from lossless compression?

A. Lossy compression preserves all information from the original image

B. Lossy compression sacrifices some information to achieve higher compression ratios

C. Lossy compression converts images to binary format

D. Lossy compression increases image resolution

Answer: B. Lossy compression sacrifices some information to achieve higher compression ratios

Explanation: Lossy compression sacrifices some information to achieve higher compression ratios, whereas lossless compression preserves all information from the original image without any loss.

20. How does wavelet compression differ from traditional compression methods?

A. Wavelet compression applies spatial filters

B. Wavelet compression increases image resolution

C. Wavelet compression decomposes the image into different frequency components for compression

D. Wavelet compression converts images to grayscale

Answer: C. Wavelet compression decomposes the image into different frequency components for compression

Explanation: Wavelet compression differs from traditional compression methods by decomposing the image into different frequency components for compression, allowing for efficient representation of both global and local image features.

21. What is the primary advantage of embedded bitstreams in image compression?

A. They increase image resolution

B. They provide a progressive transmission capability, allowing images to be displayed at different qualities

C. They convert images to binary format

D. They apply spatial filtering

Answer: B. They provide a progressive transmission capability, allowing images to be displayed at different qualities

Explanation: Embedded bitstreams in image compression provide a progressive transmission capability, allowing images to be displayed at different qualities as more data is received, enhancing user experience and network efficiency.

22. How do reversible compression algorithms differ from irreversible compression algorithms?

A. Reversible compression algorithms sacrifice some information to achieve higher compression ratios

B. Reversible compression algorithms preserve all information from the original image without any loss

C. Irreversible compression algorithms convert images to binary format

D. Irreversible compression algorithms increase image resolution

Answer: B. Reversible compression algorithms preserve all information from the original image without any loss

Explanation: Reversible compression algorithms preserve all information from the original image without any loss, while irreversible compression algorithms sacrifice some information to achieve higher compression ratios.

23. What is the main benefit of using predictive coding in image compression?

A. To increase image brightness

B. To convert images to grayscale

C. To reduce redundancy by predicting pixel values from neighboring pixels

D. To apply frequency domain filtering

Answer: C. To reduce redundancy by predicting pixel values from neighboring pixels

Explanation: The main benefit of using predictive coding in image compression is to reduce redundancy by predicting pixel values from neighboring pixels, achieving higher compression ratios.

24. How does the concept of quantization affect image compression?

A. It increases image resolution

B. It converts images to binary format

C. It reduces the precision of pixel values to facilitate compression

D. It applies color enhancement

Answer: C. It reduces the precision of pixel values to facilitate compression

Explanation: Quantization in image compression reduces the precision of pixel values to facilitate compression, allowing for the representation of pixel values with fewer bits.

25. What is the primary purpose of entropy coding in image compression?

A. To increase image brightness

B. To convert images to grayscale

C. To encode the compressed image data efficiently using variable-length codes

D. To apply spatial filtering

Answer: C. To encode the compressed image data efficiently using variable-length codes

Explanation: The primary purpose of entropy coding in image compression is to encode the compressed image data efficiently using variable-length codes, optimizing the use of available bits for representation.

26. How does vector quantization differ from scalar quantization in image compression?

A. Vector quantization applies spatial filters

B. Vector quantization increases image resolution

C. Vector quantization compresses blocks of pixels together as vectors, while scalar quantization treats each pixel independently

D. Vector quantization converts images to grayscale

Answer: C. Vector quantization compresses blocks of pixels together as vectors, while scalar quantization treats each pixel independently

Explanation: Vector quantization in image compression compresses blocks of pixels together as vectors, while scalar quantization treats each pixel independently, potentially achieving higher compression ratios at the cost of increased complexity.

27. What role does entropy play in reversible compression algorithms?

A. Entropy increases image resolution

B. Entropy measures the amount of information in the compressed image

C. Entropy applies color enhancement

D. Entropy converts images to binary format

Answer: B. Entropy measures the amount of information in the compressed image

Explanation: Entropy in reversible compression algorithms measures the amount of information in the compressed image, providing insights into the efficiency of the compression process.

28. How does fractal compression exploit self-similarity in images?

A. By converting images to binary format

B. By applying spatial filters

C. By encoding regions of an image as transformations of other regions

D. By increasing image brightness

Answer: C. By encoding regions of an image as transformations of other regions

Explanation: Fractal compression exploits self-similarity in images by encoding regions of an image as transformations of other regions, achieving high compression ratios for images with fractal-like properties.

29. What distinguishes reversible wavelet transforms from irreversible wavelet transforms?

A. Reversible wavelet transforms sacrifice some information to achieve higher compression ratios

B. Reversible wavelet transforms preserve all information from the original image without any loss

C. Irreversible wavelet transforms convert images to binary format

D. Irreversible wavelet transforms convert images to binary format

Explanation: Reversible wavelet transforms preserve all information from the original image without any loss, while irreversible wavelet transforms sacrifice some information to achieve higher compression ratios.

30. How does the Embedded ZeroTree Wavelet (EZW) algorithm contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By providing a progressive transmission capability

D. By converting images to grayscale

Answer: C. By providing a progressive transmission capability

Explanation: The Embedded ZeroTree Wavelet (EZW) algorithm contributes to image compression by providing a progressive transmission capability, allowing images to be transmitted efficiently in a hierarchical manner.

31. What is the main advantage of using JPEG 2000 over traditional JPEG compression?

A. JPEG 2000 increases image resolution

B. JPEG 2000 provides lossless compression

C. JPEG 2000 offers better compression efficiency and supports progressive transmission

D. JPEG 2000 applies spatial filtering

Answer: C. JPEG 2000 offers better compression efficiency and supports progressive transmission

Explanation: The main advantage of using JPEG 2000 over traditional JPEG compression is that JPEG 2000 offers better compression efficiency and

supports progressive transmission, allowing for higher quality and more flexible image compression.

32. How does the Burrows-Wheeler Transform (BWT) contribute to data compression?

A. By increasing image resolution

B. By applying spatial filters

C. By rearranging data to improve compressibility

D. By converting images to grayscale

Answer: C. By rearranging data to improve compressibility

Explanation: The Burrows-Wheeler Transform (BWT) contributes to data compression by rearranging data to improve compressibility, making it more suitable for subsequent entropy coding.

33. What role does the context modeling technique play in compression algorithms?

A. It increases image resolution

B. It converts images to binary format

C. It improves compression efficiency by exploiting statistical dependencies in the data

D. It applies color enhancement

Answer: C. It improves compression efficiency by exploiting statistical dependencies in the data

Explanation: The context modeling technique improves compression efficiency by exploiting statistical dependencies in the data, allowing for better prediction and encoding of symbols.

34. How does the concept of inter-frame coding contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By encoding the differences between consecutive frames to reduce redundancy

D. By converting images to grayscale

Answer: C. By encoding the differences between consecutive frames to reduce redundancy

Explanation: Inter-frame coding in video compression contributes by encoding the differences between consecutive frames to reduce redundancy, enabling more efficient representation of video sequences.

35. What distinguishes the motion compensation technique in video compression?

A. It increases image resolution

B. It converts images to binary format

C. It predicts motion between frames and encodes the differences based on this prediction

D. It applies spatial filtering

Answer: C. It predicts motion between frames and encodes the differences based on this prediction

Explanation: The motion compensation technique in video compression predicts motion between frames and encodes the differences based on this prediction, reducing redundancy in the video data.

36. How does the Discrete Cosine Transform (DCT) contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By transforming image data into frequency components for compression

D. By converting images to grayscale

Answer: C. By transforming image data into frequency components for compression

Explanation: The Discrete Cosine Transform (DCT) contributes to video compression by transforming image data into frequency components for compression, allowing for efficient representation of video frames.

37. What is the primary function of the quantization step in video compression?

A. To increase image resolution

B. To convert images to binary format

C. To reduce the precision of transformed coefficients to facilitate compression

D. To apply spatial filtering

Answer: C. To reduce the precision of transformed coefficients to facilitate compression

Explanation: The primary function of the quantization step in video compression is to reduce the precision of transformed coefficients to facilitate compression, effectively reducing the amount of data to be encoded.

38. How does entropy coding contribute to reducing the bit rate in video compression?

A. By increasing image resolution

B. By converting images to binary format

C. By encoding the compressed video data efficiently using variable-length codes

D. By applying spatial filtering

Answer: C. By encoding the compressed video data efficiently using variable-length codes

Explanation: Entropy coding in video compression contributes to reducing the bit rate by encoding the compressed video data efficiently using variable-length codes, optimizing the use of available bits for representation.

39. What distinguishes constant bit rate (CBR) encoding from variable bit rate (VBR) encoding in video compression?

A. CBR encoding provides better quality but lower compression ratios compared to VBR encoding

B. CBR encoding maintains a constant bit rate throughout the video, while VBR encoding allows for fluctuations in bit rate based on scene complexity

C. CBR encoding converts images to grayscale

D. CBR encoding applies spatial filtering

Answer: B. CBR encoding maintains a constant bit rate throughout the video, while VBR encoding allows for fluctuations in bit rate based on scene complexity

Explanation: Constant bit rate (CBR) encoding maintains a constant bit rate throughout the video, while variable bit rate (VBR) encoding allows for fluctuations in bit rate based on scene complexity, potentially achieving better compression efficiency.

40. How does the Long-Term Reference (LTR) technique improve compression efficiency in video coding?

A. By increasing image resolution

B. By applying spatial filters

C. By utilizing previously encoded frames as reference for subsequent frames, reducing redundancy

D. By converting images to grayscale

Answer: C. By utilizing previously encoded frames as reference for subsequent frames, reducing redundancy

Explanation: The Long-Term Reference (LTR) technique improves compression efficiency in video coding by utilizing previously encoded frames as reference for subsequent frames, reducing redundancy and improving compression ratios.

41. What role does motion estimation play in video compression?

A. It increases image resolution

B. It converts images to binary format

C. It predicts motion between frames to reduce redundancy

D. It applies spatial filtering

Answer: C. It predicts motion between frames to reduce redundancy

Explanation: Motion estimation in video compression predicts motion between frames to reduce redundancy, allowing for efficient representation of moving objects in video sequences.

42. How does the concept of macroblocks contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By dividing frames into smaller blocks for motion estimation and compensation

D. By converting images to grayscale

Answer: C. By dividing frames into smaller blocks for motion estimation and compensation

Explanation: The concept of macroblocks in video compression contributes by dividing frames into smaller blocks for motion estimation and compensation, enabling accurate prediction of motion between frames.

43. What is the primary advantage of using bi-directional prediction in video compression?

A. It increases image resolution

B. It converts images to binary format

C. It improves prediction accuracy by considering frames from both past and future reference frames

D. It applies spatial filtering

Answer: C. It improves prediction accuracy by considering frames from both past and future reference frames

Explanation: The primary advantage of using bi-directional prediction in video compression is that it improves prediction accuracy by considering frames from both past and future reference frames, enhancing compression efficiency.

44. How does the concept of frame skipping contribute to real-time video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By selectively encoding only key frames and skipping intermediate frames to reduce processing overhead

D. By converting images to grayscale

Answer: C. By selectively encoding only key frames and skipping intermediate frames to reduce processing overhead

Explanation: Frame skipping in real-time video compression contributes by selectively encoding only key frames and skipping intermediate frames to reduce processing overhead, enabling efficient compression in real-time applications.

45. What distinguishes intra-frame coding from inter-frame coding in video compression?

A. Intra-frame coding applies compression techniques within individual frames, while inter-frame coding exploits temporal redundancy between frames.

B. Intra-frame coding focuses on compression within key frames, while inter-frame coding prioritizes compression between key frames.

C. Intra-frame coding converts images to grayscale, while inter-frame coding applies spatial filters.

D. Intra-frame coding increases image resolution, while inter-frame coding decreases image resolution.

Answer: A. Intra-frame coding applies compression techniques within individual frames, while inter-frame coding exploits temporal redundancy between frames.

Explanation: Intra-frame coding applies compression techniques within individual frames, while inter-frame coding exploits temporal redundancy between frames for compression.

46. How does the concept of scene change detection contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By identifying abrupt changes in the scene to trigger key frame insertion or encoding changes

D. By converting images to grayscale

Answer: C. By identifying abrupt changes in the scene to trigger key frame insertion or encoding changes

Explanation: Scene change detection in video compression contributes by identifying abrupt changes in the scene to trigger key frame insertion or encoding changes, optimizing compression efficiency.

47. What is the primary function of deblocking filters in video compression?

A. To increase image resolution

B. To convert images to binary format

C. To reduce artifacts introduced by block-based compression techniques

D. To apply spatial filtering

Answer: C. To reduce artifacts introduced by block-based compression techniques

Explanation: The primary function of deblocking filters in video compression is to reduce artifacts introduced by block-based compression techniques, improving visual quality.

48. How does the concept of motion compensation differ from motion estimation in video compression?

A. Motion compensation predicts motion between frames, while motion estimation quantifies the amount of motion.

B. Motion compensation applies spatial filters to compensate for motion, while motion estimation predicts future motion.

C. Motion compensation estimates motion by comparing frames, while motion estimation compensates for motion by warping frames.

D. Motion compensation predicts motion by analyzing pixel displacements, while motion estimation predicts future motion vectors.

Answer: A. Motion compensation predicts motion between frames, while motion estimation quantifies the amount of motion.

Explanation: Motion compensation predicts motion between frames by analyzing pixel displacements, while motion estimation quantifies the amount of motion by comparing frames.

49. What is the primary purpose of wavelet transform coding in image compression?

A. To increase image resolution

B. To convert images to binary format

C. To provide a multi-resolution representation of the image for efficient compression

D. To apply spatial filtering

Answer: C. To provide a multi-resolution representation of the image for efficient compression

Explanation: The primary purpose of wavelet transform coding in image compression is to provide a multi-resolution representation of the image, which facilitates efficient compression by capturing details at different scales.

50. How does the JPEG 2000 compression standard improve upon the original JPEG standard?

A. JPEG 2000 increases image resolution compared to JPEG.

B. JPEG 2000 provides lossless compression, while JPEG offers lossy compression.

C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

D. JPEG 2000 applies spatial filtering, unlike JPEG.

Answer: C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

Explanation: The JPEG 2000 compression standard improves upon the original JPEG standard by offering better compression efficiency and supporting features such as progressive transmission and region of interest coding.

51. What is the main advantage of using vector quantization in image compression?

A. It increases image resolution compared to scalar quantization.

B. It provides lossless compression.

C. It encodes blocks of pixels together as vectors, enabling higher compression ratios.

D. It applies spatial filtering to improve image quality.

Answer: C. It encodes blocks of pixels together as vectors, enabling higher compression ratios.

Explanation: The main advantage of using vector quantization in image compression is that it encodes blocks of pixels together as vectors, enabling higher compression ratios compared to scalar quantization.

52. How does transform coding contribute to image compression?

A. By increasing image resolution

B. By converting images to binary format

C. By transforming the image data into a domain where compression is more efficient

D. By applying frequency domain filtering

Answer: C. By transforming the image data into a domain where compression is more efficient

Explanation: Transform coding in image compression contributes by transforming the image data into a domain where compression is more efficient, such as the frequency domain, before encoding and compression.

53. What is the primary advantage of using reversible compression algorithms?

A. They provide higher compression ratios compared to irreversible compression algorithms.

B. They preserve all information from the original image without any loss.

C. They convert images to binary format more efficiently.

D. They apply spatial filtering to improve image quality.

Answer: B. They preserve all information from the original image without any loss.

Explanation: The primary advantage of using reversible compression algorithms is that they preserve all information from the original image without any loss, ensuring that the compressed image can be fully reconstructed to its original form.

54. What distinguishes predictive coding from transform coding in image compression?

A. Predictive coding reduces the precision of pixel values, while transform coding predicts future pixel values.

B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

C. Predictive coding applies spatial filters to enhance image quality, while transform coding rearranges pixel values for compression.

D. Predictive coding increases image resolution, while transform coding decreases image resolution.

Answer: B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

Explanation: Predictive coding predicts future pixel values based on previous values, exploiting temporal redundancy, while transform coding transforms image data into a different domain, such as frequency, for more efficient compression.

55. How does the concept of error resilience contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By encoding redundant information to recover from errors during transmission or storage

D. By converting images to grayscale

Answer: C. By encoding redundant information to recover from errors during transmission or storage

Explanation: Error resilience in video compression contributes by encoding redundant information to recover from errors during transmission or storage, improving the robustness of the compressed video data.

56. What is the primary function of motion estimation in video compression?

A. To increase image resolution

B. To convert images to binary format

C. To predict motion between frames for efficient compression

D. To apply spatial filtering

Answer: C. To predict motion between frames for efficient compression

Explanation: The primary function of motion estimation in video compression is to predict motion between frames for efficient compression, reducing redundancy by encoding only the differences between frames.

57. How does the concept of entropy coding improve compression efficiency?

A. By increasing image resolution

B. By converting images to binary format

C. By encoding the compressed data more efficiently using variable-length codes

D. By applying spatial filtering

Answer: C. By encoding the compressed data more efficiently using variable-length codes

Explanation: Entropy coding improves compression efficiency by encoding the compressed data more efficiently using variable-length codes, reducing the average number of bits required to represent symbols.

58. What is the main advantage of using lossy compression over lossless compression?

A. Lossy compression preserves all information from the original image without any loss.

B. Lossy compression achieves higher compression ratios at the expense of sacrificing some information.

C. Lossy compression converts images to binary format more efficiently.

D. Lossy compression applies spatial filtering to improve image quality.

Answer: B. Lossy compression achieves higher compression ratios at the expense of sacrificing some information.

Explanation: The main advantage of using lossy compression over lossless compression is that lossy compression achieves higher compression ratios at the expense of sacrificing some information, resulting in smaller file sizes.

59. How does the concept of region of interest coding contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By prioritizing the compression of specific regions in the image based on their importance

D. By converting images to grayscale

Answer: C. By prioritizing the compression of specific regions in the image based on their importance

Explanation: Region of interest coding in image compression contributes by prioritizing the compression of specific regions in the image based on their importance, ensuring higher quality representation of important regions.

60. What role does the concept of chroma subsampling play in image compression?

A. It increases image resolution

B. It converts images to binary format

C. It reduces the resolution of color information to achieve higher compression ratios

D. It applies spatial filtering to improve image quality

Answer: C. It reduces the resolution of color information to achieve higher compression ratios

Explanation: Chroma subsampling in image compression reduces the resolution of color information to achieve higher compression ratios, as the human visual system is less sensitive to color detail than to brightness detail.

61. What distinguishes fractal compression from traditional compression techniques?

A. Fractal compression applies spatial filters

B. Fractal compression increases image resolution

C. Fractal compression exploits self-similarity in images for compression

D. Fractal compression converts images to binary format

Answer: C. Fractal compression exploits self-similarity in images for compression

Explanation: Fractal compression distinguishes itself by exploiting self-similarity in images, representing them as transformations of other regions, which can lead to high compression ratios.

62. How does the JPEG XR (Extended Range) format improve upon traditional JPEG compression?

A. By increasing image resolution

B. By providing lossless compression

C. By offering better compression efficiency and supporting features such as extended color ranges and improved transparency handling

D. By converting images to grayscale

Answer: C. By offering better compression efficiency and supporting features such as extended color ranges and improved transparency handling

Explanation: The JPEG XR format improves upon traditional JPEG compression by offering better compression efficiency and supporting features such as extended color ranges and improved transparency handling.

63. What distinguishes error concealment from error correction in video compression?

A. Error concealment converts images to binary format

B. Error concealment applies spatial filters

C. Error concealment attempts to hide errors in the decoded video frames

D. Error concealment increases image resolution

Answer: C. Error concealment attempts to hide errors in the decoded video frames

Explanation: Error concealment in video compression attempts to hide errors in the decoded video frames, whereas error correction aims to correct errors directly.

64. How does the concept of pyramid coding contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By representing images at multiple resolutions for efficient compression

D. By converting images to grayscale

Answer: C. By representing images at multiple resolutions for efficient compression

Explanation: Pyramid coding in image compression contributes by representing images at multiple resolutions, forming a pyramid-like structure, which enables efficient compression and reconstruction at different levels of detail.

65. What is the primary purpose of differential pulse-code modulation (DPCM) in image compression?

A. To increase image resolution

B. To convert images to binary format

C. To encode the differences between consecutive pixel values to reduce redundancy

D. To apply spatial filtering

Answer: C. To encode the differences between consecutive pixel values to reduce redundancy

Explanation: The primary purpose of differential pulse-code modulation (DPCM) in image compression is to encode the differences between consecutive pixel values to reduce redundancy, achieving compression by exploiting temporal correlation.

66. How does the concept of alpha channel encoding contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By encoding transparency information, enabling efficient representation of images with transparency

D. By converting images to grayscale

Answer: C. By encoding transparency information, enabling efficient representation of images with transparency

Explanation: Alpha channel encoding in image compression contributes by encoding transparency information, enabling efficient representation of images with transparency, such as PNG images.

67. What distinguishes scalable video coding (SVC) from traditional video coding standards?

A. SVC increases image resolution

B. SVC converts images to binary format

C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback

D. SVC applies spatial filtering to improve image quality

Answer: C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback

Explanation: Scalable video coding (SVC) distinguishes itself by allowing for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback compared to traditional video coding standards.

68. What role does the quantization parameter play in image compression?

A. It increases image resolution

B. It converts images to binary format

C. It controls the level of quantization applied to transform coefficients, affecting compression quality

D. It applies spatial filtering to improve image quality

Answer: C. It controls the level of quantization applied to transform coefficients, affecting compression quality

Explanation: The quantization parameter in image compression controls the level of quantization applied to transform coefficients, affecting compression quality by determining the amount of detail preserved in the compressed image.

69. How does the concept of sub-band coding contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By decomposing the image into frequency bands for efficient compression

D. By converting images to grayscale

Answer: C. By decomposing the image into frequency bands for efficient compression

Explanation: Sub-band coding in image compression contributes by decomposing the image into frequency bands, enabling efficient compression by representing different frequency components separately.

70. What is the primary advantage of using motion-compensated prediction in video compression?

A. It increases image resolution

B. It converts images to binary format

C. It provides accurate prediction of motion between frames, leading to higher compression efficiency

D. It applies spatial filtering to improve image quality

Answer: C. It provides accurate prediction of motion between frames, leading to higher compression efficiency

Explanation: The primary advantage of using motion-compensated prediction in video compression is that it provides accurate prediction of motion between frames, leading to higher compression efficiency by reducing redundancy.

71. How does the concept of temporal redundancy contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By exploiting similarities between consecutive frames to reduce data redundancy

D. By converting images to grayscale

Answer: C. By exploiting similarities between consecutive frames to reduce data redundancy

Explanation: Temporal redundancy in video compression contributes by exploiting similarities between consecutive frames to reduce data redundancy, achieving compression by encoding only the differences between frames.

72. What is the primary function of deblocking filters in video compression?

A. To increase image resolution

B. To convert images to binary format

C. To reduce visual artifacts introduced by block-based compression techniques

D. To apply spatial filtering to improve image quality

Answer: C. To reduce visual artifacts introduced by block-based compression techniques

Explanation: The primary function of deblocking filters in video compression is to reduce visual artifacts introduced by block-based compression techniques, such as blockiness and ringing artifacts.

73. What distinguishes predictive coding from transform coding in image compression?

A. Predictive coding reduces the precision of pixel values, while transform coding predicts future pixel values.

B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

C. Predictive coding applies spatial filters to enhance image quality, while transform coding rearranges pixel values for compression.

D. Predictive coding increases image resolution, while transform coding decreases image resolution.

Answer: B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

Explanation: Predictive coding predicts future pixel values based on previous values, exploiting temporal redundancy, while transform coding transforms image data into a different domain, such as frequency, for more efficient compression.

74. How does the concept of macroblocks contribute to video compression?

A. By increasing image resolution

B. By applying spatial filters

C. By dividing frames into smaller blocks for motion estimation and compensation

D. By converting images to grayscale

Answer: C. By dividing frames into smaller blocks for motion estimation and compensation

Explanation: The concept of macroblocks in video compression contributes by dividing frames into smaller blocks for motion estimation and compensation, enabling accurate prediction of motion between frames and efficient compression.

75. What is the primary purpose of wavelet transform coding in image compression?

A. To increase image resolution

B. To convert images to binary format

C. To provide a multi-resolution representation of the image for efficient compression

D. To apply spatial filtering

Answer: C. To provide a multi-resolution representation of the image for efficient compression

Explanation: The primary purpose of wavelet transform coding in image compression is to provide a multi-resolution representation of the image, facilitating efficient compression by capturing details at different scales.

76. How does the JPEG 2000 compression standard improve upon the original JPEG standard?

A. JPEG 2000 increases image resolution compared to JPEG.

B. JPEG 2000 provides lossless compression, while JPEG offers lossy compression.

C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

D. JPEG 2000 applies spatial filtering, unlike JPEG.

Answer: C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

Explanation: The JPEG 2000 compression standard improves upon the original JPEG standard by offering better compression efficiency and supporting features such as progressive transmission and region of interest coding.

77. What distinguishes vector quantization from scalar quantization in image compression?

A. Vector quantization preserves all information from the original image without any loss.

B. Vector quantization achieves higher compression ratios compared to scalar quantization.

C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

D. Vector quantization increases image resolution compared to scalar quantization.

Answer: C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

Explanation: Vector quantization in image compression encodes blocks of pixels together as vectors, enabling higher compression ratios compared to scalar quantization, which operates on individual pixel values.

78. What distinguishes lossless compression from lossy compression?

A. Lossless compression preserves all information from the original image without any loss.

B. Lossless compression achieves higher compression ratios compared to lossy compression.

C. Lossless compression applies spatial filtering to improve image quality.

D. Lossless compression converts images to binary format more efficiently.

Answer: A. Lossless compression preserves all information from the original image without any loss.

Explanation: Lossless compression preserves all information from the original image without any loss, while lossy compression sacrifices some information to achieve higher compression ratios.

79. How does the concept of region of interest coding contribute to image compression?

A. By increasing image resolution

B. By applying spatial filters

C. By prioritizing the compression of specific regions in the image based on their importance

D. By converting images to grayscale

Answer: C. By prioritizing the compression of specific regions in the image based on their importance

Explanation: Region of interest coding in image compression contributes by prioritizing the compression of specific regions in the image based on their importance, ensuring higher quality representation of important regions.

80. What role does chroma subsampling play in image compression?

A. It increases image resolution

B. It converts images to binary format

C. It reduces the resolution of color information to achieve higher compression ratios

D. It applies spatial filtering to improve image quality

Answer: C. It reduces the resolution of color information to achieve higher compression ratios

Explanation: Chroma subsampling in image compression reduces the resolution of color information to achieve higher compression ratios, as the human visual system is less sensitive to color detail than to brightness detail.

81. How does the concept of fractal compression differ from traditional compression methods?

A. Fractal compression increases image resolution.

B. Fractal compression applies spatial filters to enhance image quality.

C. Fractal compression exploits self-similarity in images for compression.

D. Fractal compression converts images to binary format more efficiently.

Answer: C. Fractal compression exploits self-similarity in images for compression.

Explanation: Fractal compression differs from traditional methods by exploiting self-similarity in images, allowing for compression based on patterns within the image itself.

82. What distinguishes the JPEG XR (Extended Range) format from traditional JPEG compression?

A. JPEG XR provides lossless compression, while JPEG offers lossy compression.

B. JPEG XR increases image resolution compared to JPEG.

C. JPEG XR offers better compression efficiency and supports extended color ranges and improved transparency handling.

D. JPEG XR applies spatial filtering, unlike JPEG.

Answer: C. JPEG XR offers better compression efficiency and supports extended color ranges and improved transparency handling.

Explanation: The JPEG XR format improves upon traditional JPEG compression by offering better compression efficiency and supporting extended color ranges and improved transparency handling.

83. How does error concealment differ from error correction in video compression?

A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

B. Error concealment converts images to binary format.

C. Error concealment applies spatial filters to reduce visual artifacts.

D. Error concealment increases image resolution.

Answer: A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

Explanation: Error concealment and error correction differ in their approaches; error concealment focuses on hiding errors during decoding, while error correction aims to directly rectify errors.

84. How does pyramid coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By representing images at multiple resolutions for efficient compression.

D. By converting images to grayscale.

Answer: C. By representing images at multiple resolutions for efficient compression.

Explanation: Pyramid coding facilitates efficient compression by representing images at multiple resolutions, allowing for compression and reconstruction at various detail levels.

85. What is the primary purpose of differential pulse-code modulation (DPCM) in image compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To encode the differences between consecutive pixel values to reduce redundancy.

D. To apply spatial filtering to improve image quality.

Answer: C. To encode the differences between consecutive pixel values to reduce redundancy.

Explanation: Differential pulse-code modulation (DPCM) reduces redundancy in image data by encoding the differences between consecutive pixel values.

86. How does alpha channel encoding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters.

C. By encoding transparency information, enabling efficient representation of images with transparency.

D. By converting images to grayscale.

Answer: C. By encoding transparency information, enabling efficient representation of images with transparency.

Explanation: Alpha channel encoding enhances image compression by efficiently encoding transparency information, allowing for accurate representation of images with transparent elements.

87. What distinguishes scalable video coding (SVC) from traditional video coding standards?

A. SVC increases image resolution.

B. SVC converts images to binary format.

C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

D. SVC applies spatial filtering to improve image quality.

Answer: C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

Explanation: Scalable video coding (SVC) offers flexibility by enabling encoding of video at various quality levels and resolutions, which traditional standards may lack.

88. What role does the quantization parameter play in image compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

D. It applies spatial filtering to improve image quality.

Answer: C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

Explanation: The quantization parameter determines the level of quantization applied to transform coefficients, impacting the quality of compression.

89. How does sub-band coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By decomposing the image into frequency bands for efficient compression.

D. By converting images to grayscale.

Answer: C. By decomposing the image into frequency bands for efficient compression.

Explanation: Sub-band coding decomposes images into frequency bands, enabling efficient compression by representing different frequency components separately.

90. What is the primary advantage of motion-compensated prediction in video compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It provides accurate prediction of motion between frames, leading to higher compression efficiency.

D. It applies spatial filtering to improve image quality.

Answer: C. It provides accurate prediction of motion between frames, leading to higher compression efficiency.

Explanation: Motion-compensated prediction improves compression efficiency by accurately predicting motion between frames.

91. How does temporal redundancy contribute to video compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By exploiting similarities between consecutive frames to reduce data redundancy.

D. By converting images to grayscale.

Answer: C. By exploiting similarities between consecutive frames to reduce data redundancy.

Explanation: Temporal redundancy is exploited in video compression by leveraging similarities between consecutive frames to reduce data redundancy, resulting in more efficient compression.

92. What is the primary function of deblocking filters in video compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To reduce visual artifacts introduced by block-based compression techniques.

D. To apply spatial filtering to improve image quality.

Answer: C. To reduce visual artifacts introduced by block-based compression techniques.

Explanation: Deblocking filters in video compression primarily work to reduce visual artifacts, such as blockiness, introduced by block-based compression methods, thus enhancing overall video quality.

93. What distinguishes predictive coding from transform coding in image compression?

A. Predictive coding reduces the precision of pixel values, while transform coding predicts future pixel values.

B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

C. Predictive coding applies spatial filters to enhance image quality, while transform coding rearranges pixel values for compression.

D. Predictive coding increases image resolution, while transform coding decreases image resolution.

Answer: B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

Explanation: Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain, such as frequency or wavelet domain, for more efficient compression.

94. How does the concept of macroblocks contribute to video compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By dividing frames into smaller blocks for motion estimation and compensation.

D. By converting images to grayscale.

Answer: C. By dividing frames into smaller blocks for motion estimation and compensation.

Explanation: Macroblocks in video compression help to divide frames into smaller blocks, which aids in motion estimation and compensation, crucial for accurate prediction of motion between frames.

95. What is the primary purpose of wavelet transform coding in image compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To provide a multi-resolution representation of the image for efficient compression.

D. To apply spatial filtering to improve image quality.

Answer: C. To provide a multi-resolution representation of the image for efficient compression.

Explanation: Wavelet transform coding is used in image compression to provide a multi-resolution representation of the image, allowing for efficient compression by capturing details at different scales.

96. How does the JPEG 2000 compression standard improve upon the original JPEG standard?

A. JPEG 2000 increases image resolution compared to JPEG.

B. JPEG 2000 provides lossless compression, while JPEG offers lossy compression.

C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

D. JPEG 2000 applies spatial filtering, unlike JPEG.

Answer: C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

Explanation: JPEG 2000 improves upon the original JPEG standard by offering better compression efficiency and introducing features like progressive transmission and region of interest coding.

97. What distinguishes vector quantization from scalar quantization in image compression?

A. Vector quantization preserves all information from the original image without any loss.

B. Vector quantization achieves higher compression ratios compared to scalar quantization.

C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

D. Vector quantization increases image resolution compared to scalar quantization.

Answer: C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

Explanation: Vector quantization encodes blocks of pixels together as vectors, allowing for higher compression ratios compared to scalar quantization, which operates on individual pixel values.

98. What distinguishes lossless compression from lossy compression?

A. Lossless compression preserves all information from the original image without any loss.

B. Lossless compression achieves higher compression ratios compared to lossy compression.

C. Lossless compression applies spatial filtering to improve image quality.

D. Lossless compression converts images to binary format more efficiently.

Answer: A. Lossless compression preserves all information from the original image without any loss.

Explanation: Lossless compression preserves all information from the original image without any loss, unlike lossy compression, which sacrifices some information to achieve higher compression ratios.

99. How does the concept of region of interest coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters.

C. By prioritizing the compression of specific regions in the image based on their importance.

D. By converting images to grayscale.

Answer: C. By prioritizing the compression of specific regions in the image based on their importance.

Explanation: Region of interest coding prioritizes the compression of specific regions in the image based on their importance, ensuring higher quality representation of critical areas.

100. What role does chroma subsampling play in image compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It reduces the resolution of color information to achieve higher compression ratios.

D. It applies spatial filtering to improve image quality.

Answer: C. It reduces the resolution of color information to achieve higher compression ratios.

Explanation: Chroma subsampling reduces the resolution of color information to achieve higher compression ratios, as color detail is often less critical than brightness detail in visual perception.

101. How does error concealment differ from error correction in video compression?

A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

B. Error concealment converts images to binary format.

C. Error concealment applies spatial filters to reduce visual artifacts.

D. Error concealment increases image resolution.

Answer: A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

Explanation: Error concealment focuses on concealing errors in the decoded video frames to make them less noticeable, while error correction aims to directly fix errors to recover the original data.

102. How does the concept of pyramid coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By representing images at multiple resolutions for efficient compression.

D. By converting images to grayscale.

Answer: C. By representing images at multiple resolutions for efficient compression.

Explanation: Pyramid coding represents images at multiple resolutions, enabling efficient compression by capturing details at different levels of granularity.

103. What is the primary purpose of differential pulse-code modulation (DPCM) in image compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To encode the differences between consecutive pixel values to reduce redundancy.

D. To apply spatial filtering to improve image quality.

Answer: C. To encode the differences between consecutive pixel values to reduce redundancy.

Explanation: Differential pulse-code modulation (DPCM) encodes the differences between consecutive pixel values, reducing redundancy in image data.

104. How does alpha channel encoding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters.

C. By encoding transparency information, enabling efficient representation of images with transparency.

D. By converting images to grayscale.

Answer: C. By encoding transparency information, enabling efficient representation of images with transparency.

Explanation: Alpha channel encoding includes transparency information in the image data, facilitating accurate representation of transparent elements in compressed images.

105. What distinguishes scalable video coding (SVC) from traditional video coding standards?

A. SVC increases image resolution.

B. SVC converts images to binary format.

C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

D. SVC applies spatial filtering to improve image quality.

Answer: C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

Explanation: Scalable video coding (SVC) offers the ability to encode video at various quality levels and resolutions, providing flexibility during transmission and playback.

106. What role does the quantization parameter play in image compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

D. It applies spatial filtering to improve image quality.

Answer: C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

Explanation: The quantization parameter determines the level of quantization applied to transform coefficients, influencing the quality of compression.

107. How does sub-band coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By decomposing the image into frequency bands for efficient compression.

D. By converting images to grayscale.

Answer: C. By decomposing the image into frequency bands for efficient compression.

Explanation: Sub-band coding decomposes images into frequency bands, enabling efficient compression by representing different frequency components separately.

108. What is the primary advantage of motion-compensated prediction in video compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It provides accurate prediction of motion between frames, leading to higher compression efficiency.

D. It applies spatial filtering to improve image quality.

Answer: C. It provides accurate prediction of motion between frames, leading to higher compression efficiency.

Explanation: Motion-compensated prediction accurately predicts motion between frames, enhancing compression efficiency by reducing redundancy.

109. How does temporal redundancy contribute to video compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By exploiting similarities between consecutive frames to reduce data redundancy.

D. By converting images to grayscale.

Answer: C. By exploiting similarities between consecutive frames to reduce data redundancy.

Explanation: Temporal redundancy is exploited by leveraging similarities between consecutive frames to reduce data redundancy, resulting in more efficient video compression.

110. What is the primary function of deblocking filters in video compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To reduce visual artifacts introduced by block-based compression techniques.

D. To apply spatial filtering to improve image quality.

Answer: C. To reduce visual artifacts introduced by block-based compression techniques.

Explanation: Deblocking filters aim to reduce visual artifacts such as blockiness introduced by block-based compression methods, thereby enhancing the quality of compressed video.

111. What distinguishes predictive coding from transform coding in image compression?

A. Predictive coding reduces the precision of pixel values, while transform coding predicts future pixel values.

B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

C. Predictive coding applies spatial filters to enhance image quality, while transform coding rearranges pixel values for compression.

D. Predictive coding increases image resolution, while transform coding decreases image resolution.

Answer: B. Predictive coding predicts future pixel values based on previous values, while transform coding converts image data into a different domain for compression.

Explanation: Predictive coding predicts future pixel values based on previous values, while transform coding transforms image data into a different domain for compression, such as frequency or wavelet domain.

112. How does the concept of macroblocks contribute to video compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By dividing frames into smaller blocks for motion estimation and compensation.

D. By converting images to grayscale.

Answer: C. By dividing frames into smaller blocks for motion estimation and compensation.

Explanation: Macroblocks help in dividing frames into smaller blocks, facilitating motion estimation and compensation, which are crucial for accurate prediction of motion between frames in video compression.

113. What is the primary purpose of wavelet transform coding in image compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To provide a multi-resolution representation of the image for efficient compression.

D. To apply spatial filtering to improve image quality.

Answer: C. To provide a multi-resolution representation of the image for efficient compression.

Explanation: Wavelet transform coding provides a multi-resolution representation of the image, enabling efficient compression by capturing details at different scales.

114. How does the JPEG 2000 compression standard improve upon the original JPEG standard?

A. JPEG 2000 increases image resolution compared to JPEG.

B. JPEG 2000 provides lossless compression, while JPEG offers lossy compression.

C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

D. JPEG 2000 applies spatial filtering, unlike JPEG.

Answer: C. JPEG 2000 offers better compression efficiency and supports features such as progressive transmission and region of interest coding.

Explanation: JPEG 2000 improves upon the original JPEG standard by providing better compression efficiency and introducing features such as progressive transmission and region of interest coding, which enhance its capabilities for various applications.

115. What distinguishes vector quantization from scalar quantization in image compression?

A. Vector quantization preserves all information from the original image without any loss.

B. Vector quantization achieves higher compression ratios compared to scalar quantization.

C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

D. Vector quantization increases image resolution compared to scalar quantization.

Answer: C. Vector quantization encodes blocks of pixels together as vectors, enabling higher compression ratios.

Explanation: Vector quantization encodes blocks of pixels together as vectors, allowing for higher compression ratios compared to scalar quantization, which operates on individual pixel values.

116. What distinguishes lossless compression from lossy compression?

A. Lossless compression preserves all information from the original image without any loss.

B. Lossless compression achieves higher compression ratios compared to lossy compression.

C. Lossless compression applies spatial filtering to improve image quality.

D. Lossless compression converts images to binary format more efficiently.

Answer: A. Lossless compression preserves all information from the original image without any loss.

Explanation: Lossless compression preserves all information from the original image without any loss, whereas lossy compression sacrifices some information to achieve higher compression ratios.

117. How does the concept of region of interest coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters.

C. By prioritizing the compression of specific regions in the image based on their importance.

D. By converting images to grayscale.

Answer: C. By prioritizing the compression of specific regions in the image based on their importance.

Explanation: Region of interest coding prioritizes the compression of specific regions in the image based on their importance, ensuring higher quality representation of critical areas while potentially reducing the data size.

118. What role does chroma subsampling play in image compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It reduces the resolution of color information to achieve higher compression ratios.

D. It applies spatial filtering to improve image quality.

Answer: C. It reduces the resolution of color information to achieve higher compression ratios.

Explanation: Chroma subsampling reduces the resolution of color information to achieve higher compression ratios, as color detail is often less critical than brightness detail in visual perception.

119. How does error concealment differ from error correction in video compression?

A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

B. Error concealment converts images to binary format.

C. Error concealment applies spatial filters to reduce visual artifacts.

D. Error concealment increases image resolution.

Answer: A. Error concealment attempts to hide errors in the decoded video frames, while error correction aims to correct errors directly.

Explanation: Error concealment hides errors in the decoded video frames to make them less noticeable, while error correction directly fixes errors to recover the original data.

120. How does the concept of pyramid coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By representing images at multiple resolutions for efficient compression.

D. By converting images to grayscale.

Answer: C. By representing images at multiple resolutions for efficient compression.

Explanation: Pyramid coding represents images at multiple resolutions, enabling efficient compression by capturing details at different levels of granularity.

121. What is the primary purpose of differential pulse-code modulation (DPCM) in image compression?

A. To increase image resolution.

B. To convert images to binary format.

C. To encode the differences between consecutive pixel values to reduce redundancy.

D. To apply spatial filtering to improve image quality.

Answer: C. To encode the differences between consecutive pixel values to reduce redundancy.

Explanation: Differential pulse-code modulation (DPCM) encodes the differences between consecutive pixel values to reduce redundancy in image data, enhancing compression efficiency.

122. How does alpha channel encoding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters.

C. By encoding transparency information, enabling efficient representation of images with transparency.

D. By converting images to grayscale.

Answer: C. By encoding transparency information, enabling efficient representation of images with transparency.

Explanation: Alpha channel encoding includes transparency information in image data, facilitating accurate representation of transparent elements in compressed images.

123. What distinguishes scalable video coding (SVC) from traditional video coding standards?

A. SVC increases image resolution.

B. SVC converts images to binary format.

C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

D. SVC applies spatial filtering to improve image quality.

Answer: C. SVC allows for encoding video at different quality levels and resolutions, providing flexibility in transmission and playback.

Explanation: Scalable video coding (SVC) enables encoding of video at various quality levels and resolutions, offering flexibility during transmission and playback.

124. What role does the quantization parameter play in image compression?

A. It increases image resolution.

B. It converts images to binary format.

C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

D. It applies spatial filtering to improve image quality.

Answer: C. It controls the level of quantization applied to transform coefficients, affecting compression quality.

Explanation: The quantization parameter determines the level of quantization applied to transform coefficients, influencing the quality of compression.

125. How does sub-band coding contribute to image compression?

A. By increasing image resolution.

B. By applying spatial filters to reduce noise.

C. By decomposing the image into frequency bands for efficient compression.

D. By converting images to grayscale.

Answer: C. By decomposing the image into frequency bands for efficient compression.

Explanation: Sub-band coding decomposes images into frequency bands, enabling efficient compression by representing different frequency components separately.