1. Which domain is primarily utilized for restoring images through spatial filtering?

a) Time domain
b) Frequency domain
c) Color domain
d) Spatial domain

Answer: d) Spatial domain

Explanation: Spatial filtering involves modifying pixel values directly in the spatial domain, typically using convolution operations with a filter kernel.

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2. What is a common method for reducing noise in images through frequency domain filtering?

a) Median filtering
b) Gaussian filtering
c) Fourier filtering
d) Laplacian filtering

Answer: c) Fourier filtering

Explanation: Fourier filtering involves transforming the image into the frequency domain using Fourier transforms, applying filtering operations, and then transforming it back to the spatial domain.

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3. Which type of degradation assumes that the distortion applied to an image is consistent across the entire image?

a) Non-linear degradation
b) Spatially variant degradation
c) Linear position invariant degradation
d) Spatially invariant degradation

Answer: c) Linear position invariant degradation

Explanation: In linear position invariant degradation, the degradation function is the same across the entire image, and it is typically modeled as a convolution operation.

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4. What is the primary purpose of Wiener filtering in image restoration?

a) Sharpening edges
b) Enhancing contrast
c) Removing noise
d) Smoothing the image

Answer: c) Removing noise

Explanation: Wiener filtering is a method used to reduce noise from images by minimizing the mean square error between the original image and the filtered image.

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5. In image restoration, what is the role of inverse filtering?

a) Removing spatial artifacts
b) Eliminating noise
c) Restoring the original image from the degraded image
d) Enhancing image resolution

Answer: c) Restoring the original image from the degraded image

Explanation: Inverse filtering aims to recover the original image from the degraded version by applying the inverse of the degradation function.

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6. Which technique is commonly used for reconstructing images from projections, such as in computed tomography (CT) scanning?

a) Convolutional neural networks
b) Principal component analysis
c) Radon transform
d) Hough transform

Answer: c) Radon transform

Explanation: The Radon transform is frequently employed in image reconstruction from projections, particularly in medical imaging techniques like CT scanning.

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7. Which model assumes that noise in an image follows a Gaussian distribution?

a) Poisson noise model
b) Rayleigh noise model
c) Gaussian noise model
d) Uniform noise model

Answer: c) Gaussian noise model

Explanation: Gaussian noise model is commonly used to represent random noise in images, assuming a Gaussian distribution of noise values.

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8. Which filtering technique is robust against the presence of both additive noise and blurring in an image?

a) Median filtering
b) Laplacian filtering

c) Wiener filtering
d) Gaussian filtering

Answer: c) Wiener filtering

Explanation: Wiener filtering is effective in restoring images corrupted by both additive noise and blurring, by minimizing the mean square error between the original and filtered images.

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9. What is the purpose of estimating the degradation function in image restoration?

a) To enhance image contrast
b) To sharpen image edges
c) To remove noise
d) To accurately restore the original image

Answer: d) To accurately restore the original image

Explanation: Estimating the degradation function helps in accurately restoring the original image from its degraded version by understanding the nature of the distortion applied.

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10. Which method is commonly used for reducing salt and pepper noise in images?

a) Laplacian filtering
b) Median filtering
c) Gaussian filtering
d) Butterworth filtering

Answer: b) Median filtering

Explanation: Median filtering is particularly effective in reducing salt and pepper noise, as it replaces each pixel’s value with the median value in its neighborhood, which is less affected by extreme noise values.

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