SNS COLLEGE OF ENGINEERING

AN AUTONOMOUS INSTITUTION

Accredited by NAAC – UGC with 'A' Grade

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UNIT – 2

IMAGE ENHANCEMENT AND RESTORATION

1. **Histogram equalization is used to:** a) Reduce noise in an image
   b) Improve image contrast
   c) Smooth image edges
   d) Compress the image
   Answer: b) Improve image contrast
2. **Which of the following best describes histogram matching?** a) Modifying the histogram of an image to match a specified histogram
   b) Adjusting pixel intensity to improve contrast
   c) Smoothing the image using a linear filter
   d) Enhancing image edges
   Answer: a) Modifying the histogram of an image to match a specified histogram
3. **Local histogram processing is primarily used for:** a) Global contrast adjustment
   b) Enhancing local image details
   c) Image compression
   d) Noise reduction
   Answer: b) Enhancing local image details
4. **Which of the following is NOT a type of smoothing linear filter?** a) Mean filter
   b) Median filter
   c) Gaussian filter
   d) Laplacian filter
   Answer: d) Laplacian filter
5. **The purpose of a sharpening spatial filter is to:** a) Blur the image
   b) Reduce noise
   c) Enhance edges in the image
   d) Match histograms
   Answer: c) Enhance edges in the image
6. **In the context of image restoration, what does the Wiener filter primarily aim to minimize?** a) Mean square error
   b) Contrast
   c) Noise

d) Brightness
Answer: a) Mean square error

7. **Which noise model is commonly assumed to follow a Gaussian distribution?** a) Salt-and-pepper noise
   b) Speckle noise
   c) Poisson noise
   d) Additive white noise
   Answer: d) Additive white noise
8. **The inverse filtering technique is used to:** a) Remove noise by averaging pixel values
   b) Recover an image from a blurred version
   c) Enhance the edges of an image
   d) Perform histogram equalization
   Answer: b) Recover an image from a blurred version
9. **Geometric transformation in image processing refers to:** a) Changing the intensity values of an image
   b) Altering the position of pixels in an image
   c) Smoothing the image
   d) Noise reduction
   Answer: b) Altering the position of pixels in an image
10. **Which of the following is a common method for noise reduction in images?** a) Inverse filtering
    b) Wiener filtering
    c) Histogram equalization
    d) Histogram matching
    Answer: b) Wiener filtering
11. **The process of adjusting pixel intensity values based on the probability distribution is known as:** a) Histogram equalization
    b) Geometric transformation
    c) Image restoration
    d) Spatial filtering
    Answer: a) Histogram equalization
12. **Which filter is specifically designed to sharpen the details in an image?** a) Low-pass filter
    b) High-pass filter
    c) Median filter
    d) Gaussian filter
    Answer: b) High-pass filter
13. **A model of image degradation/restoration primarily includes:**
    a) The blurring function and noise
    b) Histogram equalization
    c) Image segmentation
    d) Edge detection
    Answer: a) The blurring function and noise
14. **In the context of image processing, 'constrained least mean square filtering' is used to:** a) Reduce image noise
    b) Enhance image contrast

c) Restore degraded images
d) Match histograms
Answer: c) Restore degraded images

15. **Which of the following is a nonlinear filter used for image smoothing?** a) Mean filter
    b) Median filter
    c) Gaussian filter
    d) Wiener filter
    Answer: b) Median filter
16. **The purpose of using a Laplacian filter in image processing is to:** a) Smooth the image
    b) Enhance image edges
    c) Reduce noise
    d) Match histograms
    Answer: b) Enhance image edges
17. **In image restoration, the process of removing blur caused by a known point spread function is called:** a) Wiener filtering
    b) Inverse filtering
    c) Geometric transformation
    d) Histogram equalization
    Answer: b) Inverse filtering
18. **Which type of noise is typically reduced using median filtering?** a) Gaussian noise
    b) Salt-and-pepper noise
    c) Speckle noise
    d) Poisson noise
    Answer: b) Salt-and-pepper noise
19. **Geometric transformations can include operations like:** a) Translation, rotation, scaling
    b) Noise reduction, histogram equalization, sharpening
    c) Smoothing, sharpening, filtering
    d) Contrast adjustment, brightness adjustment, thresholding
    Answer: a) Translation, rotation, scaling
20. **In image processing, the term "restoration" generally refers to:** a) Improving image contrast
    b) Reconstructing a degraded image
    c) Enhancing image edges
    d) Matching histograms
    Answer: b) Reconstructing a degraded image
21. **Which filter minimizes the mean square error between the estimated image and the original image?** a) Inverse filter
    b) Wiener filter
    c) Median filter
    d) Gaussian filter
    Answer: b) Wiener filter
22. **A low-pass filter is typically used to:** a) Sharpen the image
    b) Reduce high-frequency noise
    c) Enhance edges

d) Perform histogram equalization
Answer: b) Reduce high-frequency noise

23. **Which of the following is NOT a characteristic of histogram statistics used for image enhancement?** a) Mean
    b) Variance
    c) Skewness
    d) Sampling rate
    Answer: d) Sampling rate
24. **Which technique is used to correct geometric distortions in an image?** a) Histogram equalization
    b) Geometric transformation
    c) Wiener filtering
    d) Median filtering
    Answer: b) Geometric transformation
25. **In image enhancement, what is the primary goal of applying a sharpening spatial filter?** a) To blur the image
    b) To increase image contrast
    c) To reduce noise
    d) To enhance the edges and fine details
    Answer: d) To enhance the edges and fine details

Fill-in-the-Blanks

1. **The process of modifying an image's histogram to improve contrast is called _____.**
   Answer: Histogram equalization
2. **_____ filtering is a common technique for noise reduction that works by averaging pixel values.**
   Answer: Smoothing
3. **The model of image degradation/restoration typically involves a _____ function that blurs the image.**
   Answer: Point spread
4. **In image processing, _____ filtering is used to remove additive noise by minimizing the mean square error.**
   Answer: Wiener
5. **The process of altering an image's geometric properties, such as rotating or scaling, is known as _____.**
   Answer: Geometric transformation
6. **_____ noise is characterized by random occurrences of white and black pixels in an image.**
   Answer: Salt-and-pepper
7. **The filter that is used to enhance the edges of an image is called a _____ filter.**
   Answer: Sharpening
8. **Local histogram processing is used to enhance _____ in small areas of an image.**
   Answer: Contrast

9. **Inverse filtering is primarily used to remove _____ from an image.**
   Answer: Blur
10. **In digital image processing, a _____ filter is used to reduce high-frequency noise by averaging pixel values.**
    Answer: Low-pass
11. **_____ is a technique used in image processing to adjust the intensity of pixels in an image to match a reference histogram.**
    Answer: Histogram matching
12. **The term _____ refers to the measure of the brightness or darkness of an image.**
    Answer: Intensity
13. **A filter that is used to reduce noise in an image by taking the median of surrounding pixel values is known as a _____ filter.**
    Answer: Median
14. **The Wiener filter is particularly effective in minimizing the _____ error in the restored image.**
    Answer: Mean square
15. **Histogram equalization improves image contrast by spreading out the most frequent _____ values.**
    Answer: Intensity
16. **A _____ filter is typically used to reduce the effect of salt-and-pepper noise.**
    Answer: Median
17. **The process of modifying an image's geometric properties without altering its pixel values is called _____.**
    Answer: Geometric transformation
18. **_____ refers to the process of converting a blurred image back to its original state using a known blur function.**
    Answer: Inverse filtering