UNIT – 5

COMPUTER VISION

1. **The process by which a 3D scene is projected onto a 2D plane in computer vision is known as:** a) Image segmentation
   b) Image formation
   c) Image enhancement
   d) Image compression
   Answer: b) Image formation
2. **Which of the following geometric transformations involves rotating an image around a specific point?** a) Translation
   b) Scaling
   c) Rotation
   d) Shearing
   Answer: c) Rotation
3. **Photometric image formation refers to:** a) The spatial arrangement of pixels
   b) The interaction of light with surfaces and its capture by a sensor
   c) The digital representation of image intensity
   d) The enhancement of image contrast
   Answer: b) The interaction of light with surfaces and its capture by a sensor
4. **The digital camera primarily converts:** a) Electrical signals to light
   b) Light into electrical signals
   c) Light into sound
   d) Electrical signals into sound
   Answer: b) Light into electrical signals
5. **Point operators in image processing are used to:** a) Modify individual pixel values independently of others
   b) Enhance edges in an image
   c) Apply geometric transformations
   d) Combine multiple images into one
   Answer: a) Modify individual pixel values independently of others
6. **Linear filtering in image processing involves:** a) Nonlinear operations on image pixels
   b) Multiplying pixel values by constants to enhance contrast
   c) Convolution of an image with a kernel

d) Applying geometric transformations
Answer: c) Convolution of an image with a kernel

7. **Neighborhood operators in image processing typically:** a) Modify a pixel based on its neighbors
b) Enhance global image properties
c) Adjust the overall brightness of an image
d) Segment the image into regions
Answer: a) Modify a pixel based on its neighbors

8. **Pyramids in image processing are used to:** a) Decompose an image into different frequency bands
b) Increase the resolution of an image
c) Reduce noise
d) Apply nonlinear filtering
Answer: a) Decompose an image into different frequency bands

9. **Wavelet transforms are advantageous because they:** a) Only work in the spatial domain
b) Provide both frequency and spatial information
c) Are simpler than Fourier transforms
d) Require less computational power than other transforms
Answer: b) Provide both frequency and spatial information

10. **Fourier Transforms are primarily used to:** a) Convert images from the spatial domain to the frequency domain
b) Enhance image contrast
c) Apply nonlinear transformations
d) Perform edge detection
Answer: a) Convert images from the spatial domain to the frequency domain

11. **Geometric transformations like scaling affect the image by:** a) Changing the intensity of individual pixels
b) Modifying the image size while maintaining the aspect ratio
c) Rotating the image
d) Converting the image to grayscale
Answer: b) Modifying the image size while maintaining the aspect ratio

12. **Photometric image formation is influenced by:** a) The geometry of the scene only
b) The color of the objects only
c) Light sources, surface reflectance, and sensor characteristics
d) The resolution of the camera sensor
Answer: c) Light sources, surface reflectance, and sensor characteristics

13. **Point operators are particularly useful for:** a) Applying global changes to an image
b) Pixel-wise adjustments like contrast enhancement or thresholding
c) Detecting edges
d) Compressing images
Answer: b) Pixel-wise adjustments like contrast enhancement or thresholding

14. **Neighborhood operators are typically used in:** a) Applying global transformations
b) Filtering operations such as blurring or sharpening
c) Image compression

d) Image compression
Answer: b) Filtering operations such as blurring or sharpening

15. **In image processing, pyramids are often constructed by:** a) Increasing the number of pixels in an image
b) Downsampling and then filtering the image
c) Upsampling the image multiple times
d) Combining several images into one
Answer: b) Downsampling and then filtering the image

16. **The key difference between wavelet and Fourier transforms is:** a) Fourier transforms provide time-domain information
b) Wavelet transforms provide better spatial localization of features
c) Fourier transforms are always more accurate
d) Wavelet transforms are linear, whereas Fourier transforms are nonlinear
Answer: b) Wavelet transforms provide better spatial localization of features

17. **Which of the following is a common application of computer vision?** a) Image compression
b) Autonomous vehicles for object detection and recognition
c) Audio signal processing
d) Data encryption
Answer: b) Autonomous vehicles for object detection and recognition

18. **The primary role of geometric primitives in computer vision is to:** a) Encode the color of an image
b) Describe basic shapes like points, lines, and polygons
c) Enhance image contrast
d) Reduce image noise
Answer: b) Describe basic shapes like points, lines, and polygons

19. **The purpose of applying linear filtering in computer vision tasks is typically to:** a) Change the resolution of the image
b) Apply geometric transformations
c) Perform operations like blurring, sharpening, or edge detection
d) Compress the image
Answer: c) Perform operations like blurring, sharpening, or edge detection

20. **Which of the following transformations would you use to change the position of an image without altering its shape?** a) Rotation
b) Translation
c) Scaling
d) Shearing
Answer: b) Translation

Fill-in-the-Blanks

1. **The process by which a 3D scene is projected onto a 2D plane is called _____.**
Answer: Image formation

2. **Photometric image formation considers factors like light sources, surface reflectance, and _____ characteristics.**
Answer: Sensor

3. **A digital camera converts _____ into electrical signals.**
   Answer: Light
4. **Point operators modify individual pixel values independently, often used for _____ enhancement.**
   Answer: Contrast
5. **Linear filtering involves convolving an image with a _____ to achieve effects like blurring or sharpening.**
   Answer: Kernel
6. **Neighborhood operators adjust a pixel's value based on its _____.**
   Answer: Neighbors
7. **Pyramids in image processing allow for multi-resolution analysis by decomposing an image into different _____ bands.**
   Answer: Frequency
8. **Wavelet transforms provide both _____ and spatial information about the image.**
   Answer: Frequency
9. **Fourier Transforms convert images from the spatial domain to the _____ domain.**
   Answer: Frequency
10. **Geometric transformations like scaling modify the image's _____ while maintaining the aspect ratio.**
    Answer: Size
11. **A common application of computer vision in the automotive industry is for _____ detection and recognition in autonomous vehicles.**
    Answer: Object
12. **Geometric primitives include basic shapes like points, _____, and polygons.**
    Answer: Lines
13. **Linear filtering can be used for tasks such as _____, which enhances the edges of objects in an image.**
    Answer: Sharpening
14. **In the Fourier Transform, an image is analyzed in the _____ domain to identify its frequency components.**
    Answer: Frequency
15. **The purpose of _____ in computer vision is to change the position of an image without altering its size or shape.**
    Answer: Translation
16. **Neighborhood operators are commonly applied in _____ operations such as edge detection or noise reduction.**
    Answer: Filtering
17. **The primary difference between wavelet and Fourier transforms is that wavelet transforms offer better _____ localization.**
    Answer: Spatial
18. **In computer vision, _____ image formation deals with the interaction of light with objects and its capture by the camera.**
    Answer: Photometric

19. **Point operators are used for pixel-wise adjustments, such as _____ enhancement or thresholding.**
    Answer: Contrast
20. **The _____ camera is a device that captures light and converts it into digital signals for image processing.**
    Answer: Digital