Unit 5: Computer Vision

Section A: Introduction & Basics

1. Computer Vision enables machines to:
   a) Hear and interpret sounds b) Understand visual data like images & videos
   c) Perform mathematical calculations d) Translate languages only
   Answer: b) Understand visual data like images & videos

2. Computer Vision is a subfield of:
   a) Image Processing b) Artificial Intelligence c) Data Science d) Robotics only
   Answer: b) Artificial Intelligence

3. Computer Vision is a:
   a) Subset of Image Processing b) Superset of Image Processing
   c) Same as Image Processing d) Not related to Image Processing
   Answer: b) Superset of Image Processing

4. Image Processing is mainly used for:
   a) Understanding image meaning b) Enhancing raw images for further tasks
   c) Detecting objects in real-world data d) Converting text to speech
   Answer: b) Enhancing raw images for further tasks

5. Example of **Computer Vision**:
   a) Face recognition b) Image rescaling c) Brightness correction d) Tone adjustment
   Answer: a) Face recognition

Section B: Applications

6. Facial Recognition in smart homes is an application of:
   a) NLP b) Computer Vision c) Robotics d) Image Processing
   Answer: b) Computer Vision

7. Instagram and Snapchat filters use:
   a) Object detection b) Face filters (Computer Vision) c) Image compression d) Audio recognition
   Answer: b) Face filters (Computer Vision)

8. Google's "Search by Image" works by:
   a) Matching colors b) Comparing image features with a database
   c) Using only text tags d) Translating pixel values
   Answer: b) Comparing image features with a database

9. Self-driving cars rely heavily on:
   a) Computer Vision b) Natural Language Processing
   c) Data Mining d) Cryptography
   Answer: a) Computer Vision

10. Medical Imaging with Computer Vision helps doctors:
    a) Write prescriptions automatically b) Convert 2D scans into 3D models
    c) Replace human surgeries d) Perform billing tasks
    Answer: b) Convert 2D scans into 3D models

Section C: Computer Vision Tasks

11. Image Classification assigns:
    a) Multiple labels b) One label from a set of categories c) No labels d) Only grayscale values
    Answer: b) One label from a set of categories

12. Classification + Localization involves:
    a) Identifying what object is present and where it is located b) Only resizing an image
    c) Converting color to grayscale d) Edge detection only
    Answer: a) Identifying what object is present and where it is located

13. Object Detection refers to:
    a) Just identifying an object b) Finding instances and locations of real-world objects
    c) Adjusting brightness d) Removing background noise
    Answer: b) Finding instances and locations of real-world objects

14. Instance Segmentation assigns:
    a) A single label to the whole image b) Labels to each pixel of detected objects
    c) Features only to grayscale images d) Only RGB values
    Answer: b) Labels to each pixel of detected objects

15. Example of Object Detection:
    a) Detecting cars in traffic b) Rescaling an image c) Color enhancement d) Noise reduction
    Answer: a) Detecting cars in traffic

Section D: Basics of Images

16. The word “pixel” stands for:
    a) Picture element b) Pixel element c) Picture expansion d) Pixel extraction
    Answer: a) Picture element

17. Pixels are usually arranged in:
    a) 1D array b) 2D grid c) 3D cube d) Random form
    Answer: b) 2D grid

18. More pixels in an image means:
    a) Lower resemblance to original b) Closer resemblance to original
    c) Higher noise d) Lower resolution
    Answer: b) Closer resemblance to original

19. Resolution of 1280×1024 means:
    a) 1280 pixels width, 1024 pixels height b) 1024 pixels width, 1280 pixels height
    c) 1280 megapixels d) 1.31 kilopixels
    Answer: a) 1280 pixels width, 1024 pixels height

20. 1 Megapixel = ?
    a) 10,000 pixels b) 100,000 pixels c) 1 million pixels d) 100 million pixels
    Answer: c) 1 million pixels

Section E: Pixel Values

21. Pixel values range from:
    a) 0–10 b) 0–100 c) 0–255 d) 0–1000
    Answer: c) 0–255

22. Pixel value of 0 usually means:
    a) Full color (white) b) No color (black) c) Maximum brightness d) Random pixel
    Answer: b) No color (black)

23. Pixel value of 255 usually means:
    a) No color (black) b) Full color (white) c) Only red intensity d) No brightness
    Answer: b) Full color (white)

24. Grayscale images are made of:
    a) Three color channels b) A single plane of pixels with shades of gray
    c) Random pixel values d) Audio converted images
    Answer: b) A single plane of pixels with shades of gray

25. RGB images are stored as:
    a) One channel only b) Three channels (R, G, B) c) Four channels d) Binary values only
    Answer: b) Three channels (R, G, B)

Section F: Features in Images

26. In image processing, good features are:
    a) Flat areas b) Edges c) Corners d) Shadows
    Answer: c) Corners

27. Corners are better features because:
    a) They look the same everywhere
    b) They look different when moved
    c) They are always white
    d) They are easy to delete
    Answer: b) They look different when moved

28. Edges are weaker features than corners because:
    a) They are hard to detect
    b) They look the same along their length
    c) They don't exist in images
    d) They are always flat
    Answer: b) They look the same along their length

29. Flat surfaces are:
    a) Best features
    b) Difficult to track
    c) Always bright
    d) Equivalent to corners
    Answer: b) Difficult to track

30. Example of feature in an image:
    a) Blob
    b) Corner
    c) Edge
    d) All of the above
    Answer: d) All of the above

Section G: Convolution

31. Convolution in image processing is:
    a) Multiplication of two arrays (image & kernel)
    b) Addition of pixel values only
    c) Converting grayscale to RGB
    d) Compressing image data
    Answer: a) Multiplication of two arrays (image & kernel)

32. A kernel in convolution is:
    a) A pixel value
    b) A matrix slid across the image
    c) A type of image filter only
    d) A pixel array with no values
    Answer: b) A matrix slid across the image

33. Convolution is used in:
    a) Only image resizing
    b) Only grayscale conversion
    c) Feature extraction in images
    d) Sound recognition only
    Answer: c) Feature extraction in images

34. If we want convolution output same size as input:
    a) Use cropping
    b) Add padding (zero extension)
    c) Reduce kernel size
    d) Increase pixel values
    Answer: b) Add padding (zero extension)

35. In convolution, the output of feature extraction is called:
    a) Kernel map
    b) Feature map (Activation map)
    c) Resolution map
    d) Pixel grid
    Answer: b) Feature map (Activation map)

Section H: CNN (Convolutional Neural Networks)

36. CNN is a:
    a) Rule-based algorithm
    b) Deep Learning algorithm for images
    c) Data preprocessing tool
    d) No-code AI tool
    Answer: b) Deep Learning algorithm for images

37. First layer of CNN:
    a) Pooling Layer
    b) Convolution Layer
    c) Fully Connected Layer
    d) ReLU Layer
    Answer: b) Convolution Layer

38. ReLU layer removes:
    a) Positive numbers
    b) Negative numbers
    c) Zero values
    d) Edges
    Answer: b) Negative numbers

39. Pooling layer reduces:
    a) Image size & complexity
    b) Pixel brightness
    c) Noise in dataset
    d) RGB values
    Answer: a) Image size & complexity

40. Final CNN layer for classification is:
    a) ReLU Layer
    b) Fully Connected Layer
    c) Pooling Layer
    d) Feature Extraction Layer
    Answer: b) Fully Connected Layer

Section I: Types of Pooling

41. Max Pooling selects:
    a) Minimum value from kernel region
    b) Maximum value from kernel region
    c) Average pixel value
    d) Random pixel value
    Answer: b) Maximum value from kernel region

42. Average Pooling selects:
    a) Highest pixel value
    b) Lowest pixel value
    c) Average pixel value in region
    d) Random pixel value
    Answer: c) Average pixel value in region

43. Pooling helps CNN by:
    a) Making model more resistant to small transformations
    b) Removing RGB channels
    c) Increasing image resolution
    d) Ignoring pixel values
    Answer: a) Making model more resistant to small transformations

44. Output of CNN is usually:
    a) Text labels
    b) Probability distribution of classes
    c) Pixel arrays only
    d) Noise removed images
    Answer: b) Probability distribution of classes

45. CNN is especially powerful for:
    a) Audio transcription
    b) Image classification & object detection
    c) Text summarization
    d) Database queries
    Answer: b) Image classification & object detection

Section J: Miscellaneous

46. Which tool is a no-code AI tool for image classification?
    a) Lobe.ai
    b) Python
    c) SQL
    d) Tensorflow
    Answer: a) Lobe.ai

47. Google's **Teachable Machine** works on:
    a) SQL
    b) tensorflow.js
    c) C++
    d) NumPy
    Answer: b) tensorflow.js

48. Good features in images are generally:
    a) Flat surfaces
    b) Edges and corners
    c) Shadows
    d) Blurry regions
    Answer: b) Edges and corners

49. Which layer in CNN assigns importance to features?
    a) Pooling Layer
    b) Fully Connected Layer
    c) Convolution Layer
    d) Input Layer
    Answer: c) Convolution Layer

50. ReLU function introduces:
    a) Linearity
    b) Non-linearity
    c) Randomness
    d) Noise reduction
    Answer: b) Non-linearity