

Types of image filters and when to use which filter:

1. Blur Filters:
 - Purpose: Reduce noise, smooth images, and eliminate fine details.
 - Use Cases: Preprocessing before feature extraction, noise reduction.
 - Fields: Image preprocessing in computer vision, medical imaging, photography.
2. Sharpening Filters:
 - Purpose: Enhance edges and fine details in an image.
 - Use Cases: Improving edge detection, emphasizing details.
 - Fields: Image enhancement, computer-aided diagnosis (medical imaging), satellite imagery.
3. Edge Detection Filters:
 - Purpose: Identify boundaries between objects in an image.
 - Use Cases: Object detection, image segmentation.
 - Fields: Computer vision, robotics, autonomous vehicles, industrial inspection.
4. Gradient Filters:
 - Purpose: Highlight regions of rapid intensity change.
 - Use Cases: Edge detection, feature extraction.
 - Fields: Image analysis, computer vision, pattern recognition.
5. Embossing Filters:
 - Purpose: Create a 3D effect by highlighting the edges of objects.
 - Use Cases: Aesthetic enhancements.
 - Fields: Graphic design, artistic rendering.
6. Noise Reduction Filters:
 - Purpose: Reduce unwanted variations or artifacts in an image.
 - Use Cases: Enhance image quality, preprocessing for analysis.
 - Fields: Medical imaging, satellite imagery, industrial inspection.
7. Morphological Filters (Dilation and Erosion):
 - Purpose: Modify the shape and structure of objects in an image.
 - Use Cases: Segmentation, noise removal.
 - Fields: Image segmentation, object recognition, computer vision.
8. Contrast Enhancement Filters:
 - Purpose: Improve the visibility of features by adjusting image contrast.
 - Use Cases: Improving visibility in low-contrast images.
 - Fields: Medical imaging, astronomy, security surveillance.
9. Saturation Filters:
 - Purpose: Adjust the color intensity in images.
 - Use Cases: Color correction, enhancing or reducing color vibrancy.

- Fields: Photography, video processing, graphic design.

10. Bilateral Filter:

- Purpose: Preserve edges while smoothing the image.
- Use Cases: Denoising while retaining important details.
- Fields: Image processing, computer vision, medical imaging.

11. Anisotropic Diffusion Filter:

- Purpose: Smoothing images while preserving edges.
- Use Cases: Edge-preserving denoising.
- Fields: Medical imaging, material science, image processing.