Lesson 3: Image Filtering Techniques

Description:
This lesson covers the most common image filtering methods used to improve image quality and highlight specific features.

What is Image Filtering?

Image filtering is the process of modifying or enhancing an image by applying a filter (or kernel) that operates over the image pixels.

Types of Filters

- **Low-pass filters**: Used to remove noise or blur an image (e.g., average, Gaussian filter).

- **High-pass filters**: Used to enhance edges or fine details (e.g., Laplacian filter).

- **Median filter**: A non-linear filter that replaces each pixel with the median of its neighbors—very effective at removing salt-and-pepper noise.

Convolution Operation

Understand how filters are applied to an image using a mathematical operation called **convolution**, which involves sliding the kernel over the image matrix.

Practical Applications

- Blurring an image before edge detection

- Noise reduction in medical or satellite images

- Sharpening images for better visual appearance

Outro

A quick summary of how filtering plays a key role in both image enhancement and preparation for feature extraction.