**Lesson 4: Edge Detection and Feature Extraction**

**Description:**This lesson focuses on detecting object boundaries and extracting essential features from images using various edge detection algorithms.

**Content:**

1. **What is Edge Detection?**Edge detection identifies points in an image where brightness changes sharply, revealing boundaries of objects.
2. **Common Edge Detection Methods**
   * Sobel Operator: Detects vertical and horizontal edges using gradient approximation.
   * Prewitt Operator: Similar to Sobel but slightly simpler in computation.
   * Laplacian of Gaussian (LoG): Combines smoothing with edge detection.
   * Canny Edge Detector: A multi-stage algorithm that provides precise and clean edge maps.
3. **Thresholding in Edge Detection**Learn how setting proper thresholds can control which edges are detected and which are ignored.
4. **Feature Extraction Basics**After edge detection, features like corners, shapes, and contours can be extracted for higher-level tasks such as classification or tracking.
5. **Applications**
   * Detecting lane lines in self-driving cars
   * Identifying tumors in medical images
   * Object detection and tracking in video analysis
6. **Outro**A recap of edge detection methods and their importance in building advanced computer vision models.