

Roadmap

Week 1 — Absolute Foundations

Goal: Learn how images, video streams, and colors work in OpenCV, and confidently perform basic image manipulation.

Day 1: Understanding the basics

- Be able to capture video from a camera
 - Understand what a frame is
 - Know how pixels and arrays represent images
 - Display frames in color and in grayscale
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Day 2: Understanding Video Streams in OpenCV

- Understand how frames are read from a camera
 - Know what ret and frame mean
 - Understand how OpenCV creates live video using frames
 - Clearly know why while True is mandatory
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Day 3: Controlling Playback & Exiting Video

- Understand how keyboard input is captured in OpenCV
 - Know what `cv2.waitKey()` does and what it returns
 - Understand ASCII values and why keys are represented as numbers
 - Understand bitwise AND (&) and why `0xFF` is used
 - Implement a keyboard-controlled exit from a video loop
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Day 4: Images as NumPy Arrays

- Understand images as NumPy arrays in OpenCV
 - Read and display images using OpenCV
 - Understand image shape, channels, and pixel values
 - Differentiate between grayscale and color images
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Day 5: Drawing on Images with OpenCV

- Draw **lines, rectangles, circles, and text** on images
 - Control **color, thickness, and position** of drawings
 - Modify an image array directly
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Day 6: Image Resizing, Cropping, and Copying

- Resize images using OpenCV
 - Crop images using array slicing
 - Copy and modify image regions
 - Understand how image dimensions change after resizing and cropping
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Day 7: Image Color Spaces

- Understand what a color space is
 - Know the difference between BGR, Grayscale, and HSV
 - Convert images between color spaces using OpenCV
 - Understand when and why different color spaces are used
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◇ Week 2

Day 8: Color Detection using HSV

- Detect a specific color in an image
 - Use HSV ranges to isolate colors
 - Create and apply masks
 - Understand how color-based segmentation works
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Day 9: Trackbars for real-time HSV tuning

- Create trackbars in OpenCV
 - Adjust HSV values in real time
 - Tune color detection interactively
 - Understand how real-time parameter control works
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Day 10: Color Detection in Live Video

- Capture live video from a webcam
 - Apply HSV-based color detection on video frames
 - Combine trackbars + video feed
 - Perform real-time color segmentation
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Day 11: Noise Removal & Morphological Operations

- Understand what **noise** is in images and masks
 - Clean binary masks using **morphological operations**
 - Use **erosion, dilation, opening, and closing**
 - Improve color detection results
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Day 12: Contour Detection

- Understand what contours are
 - Detect contours from a binary image
 - Filter contours by area
 - Draw bounding boxes around detected objects
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Day 13: Object Tracking Basics

- Track a colored object across video frames
 - Use contours to find object position
 - Identify the **largest object** of a given color
 - Draw tracking visuals (center point, path)
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Day 14:

◇ Week 3

Day 15:

Day 16:

Day 17:

Day 18:

Day 19:

Day 20:

Day 21:

◇ Week 4

Day 22:

Day 23:

Day 24:

Day 25:

Day 26:

Day 27:

Day 28:

Day 29:

Day 30: