

# Basics of OpenCV, Matplotlib packages - Image read - Display operations - Color Space Conversion

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## Task 1: Image Collage Creation

**Objective:** Create a collage of images using OpenCV and Matplotlib.

1. Read multiple images using OpenCV.
2. Convert each image to grayscale.
3. Display the original and grayscale images side by side using Matplotlib.
4. Combine the grayscale images into a single collage image.
5. Save and display the collage.

## Task 2: Color Space Manipulation

**Objective:** Experiment with different color spaces.

1. Read an image using OpenCV.
2. Convert the image from BGR to RGB, HSV color spaces.
3. Display the original image alongside its different color space representations using Matplotlib.
4. Create a function to convert an image to a user-selected color space and display the result.

## Task 3: Interactive Image Display

**Objective:** Implement an interactive image display tool.

1. Read an image using OpenCV.
2. Use Matplotlib to create an interactive plot where clicking on a point in the image displays the pixel value and coordinates.
3. Implement functionality to toggle between different color spaces (BGR, RGB, Grayscale) using keyboard inputs.

## Task 4: Color Channel Analysis

**Objective:** Analyze and visualize individual color channels.

1. Read an image using OpenCV.
2. Split the image into its B, G, and R channels.
3. Display each channel separately using Matplotlib.
4. Create a composite image by manipulating the intensity of individual channels and display the result.

## Task 5: Custom Color Maps

**Objective:** Create and apply custom color maps.

1. Read an image using OpenCV.
2. Convert the image to grayscale.
3. Define a custom color map (e.g., transitioning from blue to green to red).
4. Apply the custom color map to the grayscale image.
5. Display the original, grayscale, and color-mapped images using Matplotlib.