**Introduction**

This report summarizes the image processing steps performed in the provided Jupyter Notebook. The notebook utilizes OpenCV and Matplotlib to manipulate and analyze an image. The primary operations include loading, displaying, resizing, and cropping an image.

**Libraries Used**

The following Python libraries were used in the notebook:

* **OpenCV (cv2):** Used for image reading, resizing, and manipulation.
* **NumPy:** Utilized for handling numerical operations on image arrays.
* **Matplotlib:** Used to display images in a visually interpretable format.

**Steps Performed**

**1. Loading and Displaying the Image**

The first step involves reading an image file (image.png) using OpenCV and converting it from BGR to RGB format for proper visualization in Matplotlib.

import cv2

import numpy as np

import matplotlib.pyplot as plt

# Load Image

img = cv2.imread('image.png')

img = cv2.cvtColor(img, cv2.COLOR\_BGR2RGB)

# Display the image

plt.imshow(img)

plt.title("Original Image")

plt.show()

**Explanation:**

* cv2.imread() loads the image from the specified file path.
* OpenCV loads images in BGR format by default, so cv2.cvtColor(img, cv2.COLOR\_BGR2RGB) is used to convert it to RGB format for correct color representation.
* plt.imshow(img) is used to display the image, and plt.title() adds a title to the plot.

**2. Resizing the Image**

resized = cv2.resize(img, (300, 300))

**Explanation:**

* The cv2.resize() function resizes the image to 300x300 pixels, reducing or increasing the resolution while maintaining the aspect ratio if necessary.

**3. Cropping the Image**

cropped = img[50:200, 50:200]

**Explanation:**

* The image is cropped from row indices 50 to 200 and column indices 50 to 200, effectively selecting a portion of the original image.
* Cropping is useful for focusing on specific regions of interest within an image.

**Conclusion**

The notebook demonstrates fundamental image processing techniques, including loading, displaying, resizing, and cropping an image. These basic operations serve as a foundation for more advanced image processing tasks such as object detection, feature extraction, and image segmentation.

To further enhance this notebook, additional steps like image filtering, edge detection, or color transformation can be included.