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# Image Processing Techniques

This project is about the exploration and application of basic image processing techniques in Python using libraries such as Pillow, Matplotlib, NumPy, and OpenCV. The main objective is to implement images that can be transformed through image processing techniques such as, scaling, rotation, blurring, and edge detection. The process begins with installing and importing libraries such as: Pillow for image manipulation and Matplotlib for visualization.

The first part focuses on scaling and rotating images. A function is defined to resize images to 50% of their original size and rotate them by 45 degrees. The results are displayed in three columns, showing each image in its original, scaled, and rotated states for easy comparison.

In the second part, blurring techniques are applied to the images using a function that includes Gaussian Blur, Box Blur, and Median Blur, each with specific values. Gaussian Blur provides a smooth blurring effect, Box Blur averages neighboring pixels, and Median Blur helps reduce noise by taking the median of surrounding pixel values. The results are displayed in four columns, showing the original image and each blurring transformation.

The last part of the project demonstrates edge detection that applies three methods such as Canny, Sobel, and Prewitt edge detection. Each technique offers a unique approach to identifying edges; Canny relies on gradient intensity, Sobel calculates horizontal and vertical gradients, and Prewitt provides a simpler gradient calculation. The edge detection results are displayed alongside the original images, which compares how each method has different image features.

This project showcases the application of image processing techniques that are foundational to computer vision tasks. By using scaling, rotation, blurring, and edge detection, it showcases how images can be processed to enhance, analyze, or detect details from images.