Aim: To Processing Image with OpenCV3

Objective: To Conversion between different color spaces, The Fourier Transformation , high pass filter, Low pass filter

Theory:

1. Converting between different color spaces :

Color spaces are a fundamental concept in image processing and computer vision that play a crucial role in representing colors. They are used to define a standardized method of representing colors in digital images, allowing for efficient processing and analysis. RGB is the most commonly used color space in digital imaging, but other color spaces like CMYK, HSV, and YUV are also widely used.

Techniques for Converting Between RGB and Other Color SpacesThere are several techniques for converting between RGB (Red Green Blue) and other color spaces in image processing. Some of the common techniques include:

RGB to CMYK Conversion: To convert an RGB image to a CMYK (Cyan Magenta Yellow Black) image, the RGB color values are first converted to a device-independent color space such as Lab, and then to CMYK using a color management system

2. The Fourier Transformation :

The Fourier Transform is an important image processing tool which is used to decompose an image into its sine and cosine components. The output of the transformation represents the image in the Fourier or frequency domain, while the input image is the spatial domain equivalent. In the Fourier domain image, each point represents a particular frequency contained in the spatial domain image.The Fourier Transform is used in a wide range of applications, such as image analysis, image filtering, image reconstruction and image compression.

3. High pass filter :

A high pass filter is the basis for most sharpening methods. An image is sharpened when contrast is enhanced between adjoining areas with little variation in brightness or darkness. A high pass filter tends to retain the high frequency information within an image while reducing the low frequency information. The kernel of the high pass filter is designed to increase the brightness of the center pixel relative to neighboring pixels.

4. Low pass Filter :

Low pass filtering (aka smoothing), is employed to remove high spatial frequency noise from a digital image. The low-pass filters usually employ moving window operator which affects one pixel of the image at a time, changing its value by some function of a local region (window) of pixels. The operator moves over the image to affect all the pixels in the image.

Conclusion:

In this experiment we explored various technique to convert different color spaces. we explored The Fourier Transformation Tool , this tool is used to Decompose an Image , then High Pass Filter to enhance image and Low Pass Filter to remove noise from digital image.