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# Image Processing in Open CV

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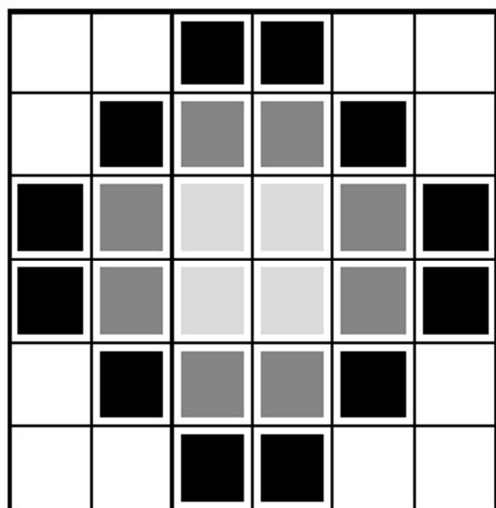
**Abstract:** Now a day's need of Machine Learning is growing day by day because by using Machine learning algorithm anyone can get accurate results. Image Processing is one of the many applications of machine Learning. OpenCV is one of the famously used open-source Python libraries meant exclusively for Computer Vision and Image Processing. Modules and methods available in OpenCV allow users to perform image processing with a few lines of codes.

## I. INTRODUCTION

Today is the age of advancement of computerized reasoning frameworks that is used for further cooperation between human and machine. Open CV is an open source library which give some functionality like computer vision, image processing using machine learning. In today's world we can use it for real time operation, by using it we can process image and videos to identify objects, faces (ie. on the base of shape, size, color) or even hand tracking human. Open CV library has more than 2500 optimized algorithms, which includes a set of both classic and state-of-the-art computer vision and machine learning algorithms. In OpenCV helps computers to understand the content of the digital images such as photographs and videos.

## II. PROPOSED PLAN OF WORK

When we see through our eyes. Our eye provide lots of information about the object which you see. Machine differentiate between objects based on some features like shape, color etc. of object. Machines are capable of seeing and process the vision into numbers and store in the memory. We use pixel value to convert images into numbers. The pixel is the basic unit of programmable color on a computer display or in a computer image.



11	11	00	00	11	11
11	00	01	01	00	11
00	01	10	10	01	00
00	01	10	10	01	00
11	00	01	01	00	11
11	11	00	00	11	11

The picture intensity at the particular location is represented by the numbers. In the above image, we have shown the pixel values for a grayscale image consist of only one value, the intensity of the black color at that location.

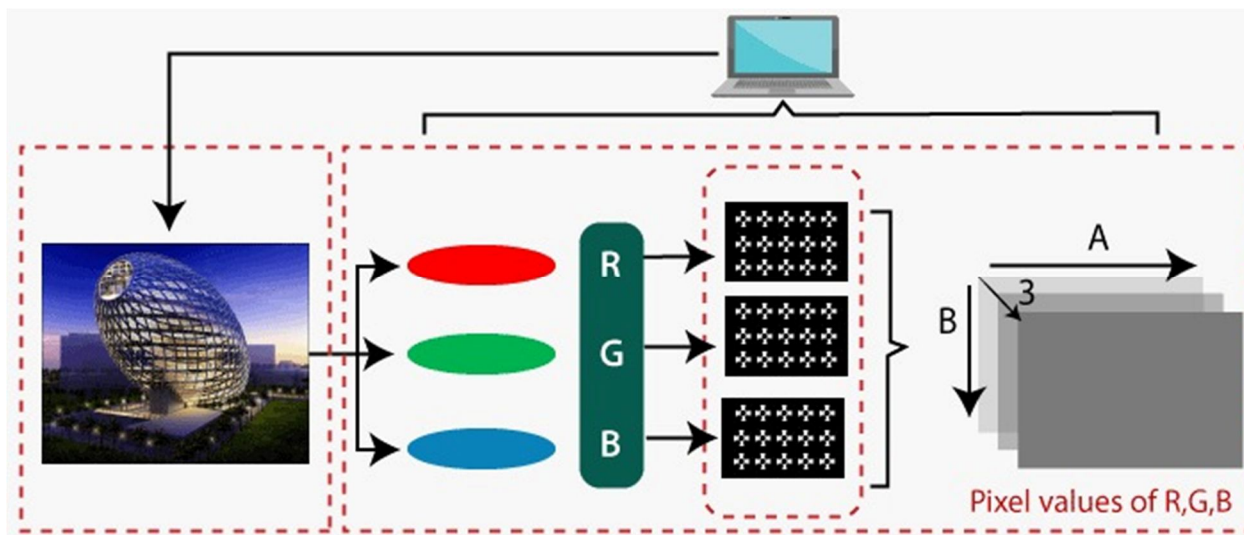
There are two common ways to identify the images:

### A. Grayscale

Grayscale images are those images which contain only two colors black and white. The contrast measurement of intensity is black treated as the weakest intensity, and white as the strongest intensity. When we use the grayscale image, the computer assigns each pixel value based on its level of darkness.

### B. RGB

An RGB is a combination of the red, green, blue color which together makes a new color. The computer retrieves that value from each pixel and puts the results in an array to be interpreted.



In this above image our Machine learning algorithm which I get from Open CV recognise image on the bases of color, shape. To find color, Machine algorithm use pixel and then at last get an RGB value to recognise the color.

### III. METHODOLOGY

The Frame work involves Open CV library used in VS code for recognising images. Open CV algorithms work by analysing image and find out some features (ie. Shape, color, density) of the image. Firstly, goal is to convert an image into a form suitable for analysis, mostly in binary. After that we perform operations such as exposure correction, color balancing, image noise reduction, or increasing image sharpness. We are using various thresholding techniques to process a color full images. Binary thresholding makes pixel values either to zero or 255 based on the threshold value provided. Image smoothing is an important image processing technique that performs blurring and noise filtering in an image.

#### A. OpenCV Image Filters

Image filtering is the process of modifying an image by changing its shades or color of the pixel. It is also used to increase brightness and contrast. In this tutorial, we will learn about several types of filters.

#### B. Bilateral Filter

OpenCV provides the `bilateralFilter()` function to apply the bilateral filter on the image. The bilateral filter can reduce unwanted noise very well while keeping edges sharp. The syntax of the function is given below:

#### C. Output



Original Image



Bilateral Filter



#### IV. CONCLUSION

In this report, we examined the plane and execution of Image Processing with the help of Open CV. The venture is constructed utilizing open source programming modules with VS code local area backing which can oblige any updates soon. Open Cv is the future of computer vision, image processing. Which has lots of application in daily life and open Cv is optimising their library so that we can use Artificial intelligence more efficiently.

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