

# PROJECT REPORT ON IMAGE CONVOLUTION

*End Semester Project for Programming Practice-II*

**By:-**

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# DECLARATION

WE HEARBY DECLARE THAT THE  
MATTER IN THIS PROJECT REPORT  
IS ORIGINAL AND HAS NOT BEEN  
SUBMITTED FOR THE AWARD OF  
ANY OTHER DEGREE.

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# CERTIFICATE

This is to certify that the project work entitled “IMAGE CONVOLUTION” carried out by Ayantha Pal , Sayan Banerjee, and Sanket Muduli bearing registration number-1741012147,1741012,1741012 the students of 5<sup>th</sup> semester B.Tech in computer Science and Engineering ,sec-G from Institute of Technical Education and Research , Bhubaneswar ,under my guidance has been completed by his/her and worthy of acceptance for the degree of bachelor of technology in Computer Science and Engineering ,under Siksha ‘O’ Anusandhan University Bhubaneswar ,Odisha.

Signature of the guide

Mrs. Samuka Mohanty

Guide

Professor

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# ACKNOWLEDGEMENT

We avail this opportunity to express our profound sense of gratitude towards Mrs. Samuka Mohanty, for her regular supervision ,guidance and encouragement right from the beginning till the completion of this project.

We wish to thank all faculty members of the Department for their valuable advice and encouragement. last but not the least ,a special thanks to all my friends and the classmates for their support and compassion

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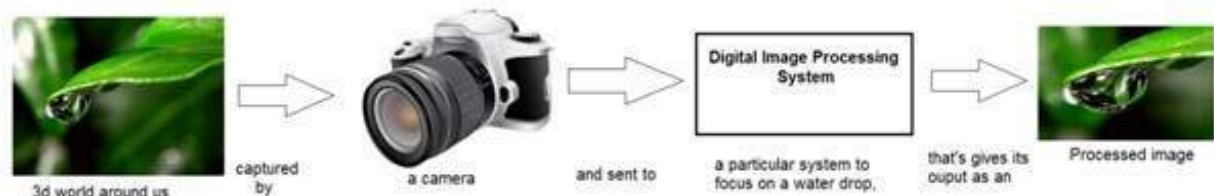
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## Problem Statement:-

To do convolution of an image using java.

## Analysis:-

Clearly, the problem is of image processing .Image processing is more or less the study of signals and systems because an image is nothing but a two dimensional signal.



## Convolution-



It can be mathematically represented as two ways

$$g(x,y) = h(x,y) * f(x,y)$$

# **Data Requirements:-**

## **Library and packages:-**

1. Image Processing package for java (Imgproc)
2. OpenCV for filter2D
3. JVM and JDK to run java files.

## **Input:-**

An greyscale image.

## **Design:-**

## **Initial Algorithm:-**

1. Get the image.
2. Apply the filter.
3. Display the convolved image.

## **Algorithm Refinement:-**

1. Import openCV and other packages.
2. Set the filter size. (we are using kernel here).
3. Read the image and convert it to grayscale.

4. Convert the image to matrix form and store in a variable.
5. Process the image using the filter and matrix multiplication. (here multiplication is done by inbuilt method of openCV, filter2D).
6. Convert the resultant matrix back to image (we are using HighGui method here).
7. Now store the image in a file. your format( We are using .jpg here).

## **Implementation:-**

```
import org.opencv.core.Core;
import org.opencv.core.CvType;
import org.opencv.core.Mat;

import org.opencv.highgui.Highgui;
import org.opencv.imgproc.Imgproc;

public class convolution {
    public static void main( String[] args ) {

        try {
            int kernelSize = 3;
            System.loadLibrary( Core.NATIVE_LIBRARY_NAME
        );

            Mat source = Highgui.imread("test.jpg",
            Highgui.CV_LOAD_IMAGE_GRAYSCALE);
```

```
        Mat destination = new  
        Mat(source.rows(),source.cols(),source.type());
```

```
        Mat kernel = new Mat(kernelSize,kernelSize,  
CvType.CV_32F) {  
        {  
            put(0,0,0);  
            put(0,1,0);  
            put(0,2,0);  
  
            put(1,0,0);  
            put(1,1,1);  
            put(1,2,0);  
  
            put(2,0,0);  
            put(2,1,0);  
            put(2,2,0);  
        }  
    };
```

```
        Imgproc.filter2D(source, destination, -1, kernel);  
        Highgui.imwrite("out.jpg", destination);
```

```
    } catch (Exception e) {  
        System.out.println("Error:" + e.getMessage());  
    }  
}  
}
```



## Testing:-



## CONCLUSION:-

While working on this project we learned about various facts and information about Data structure and its various advance features and its implementation in convolution of image and its uses in various technical fields of science , we are very much thankful to our faculty and the computer department of our university.

