JAVA DIP - PREWITT OPERATOR

http://www.tutorialspoint.com/java_dip/applying_prewitt_operator.htm

Prewitt operator is used for edge detection in an image. It detects two types of edges: vertical edges and horizontal edges.

We use **OpenCV** function **filter2D** to apply Prewitt operator to images. It can be found under **Imgproc** package. Its syntax is given below:

```
filter2D(src, dst, ddepth , kernel, anchor, delta, BORDER_DEFAULT );
```

The function arguments are described below:

Sr.No.	Arguments
1	**src** It is source image.
2	**dst** It is destination image.
3	**ddepth** It is the depth of dst. A negative value $suchas-1$ indicates that the depth is the same as the source.
4	**kernel** It is the kernel to be scanned through the image.
5	**anchor** It is the position of the anchor relative to its kernel. The location Point $-1, -1$ indicates the center by default.
6	**delta** It is a value to be added to each pixel during the convolution. By default it is 0.
7	**BORDER_DEFAULT** We let this value by default.

Apart from the filter2D method, there are other methods provide by the Imgproc class. They are described briefly:

Sr.No.	Methods
1	**cvtColor***Matsrc, Matdst, intcode, intdstCn* It converts an image from one color space to another.
2	**dilate***Matsrc, Matdst, Matkernel* It dilates an image by using a specific structuring element.
3	**equalizeHist***Matsrc, Matdst* It equalizes the histogram of a grayscale image.
4	**filter2D***Matsrc, Matdst, intddepth, Matkernel, Pointanchor, doubledelta* It convolves an image with the kernel.
5	**GaussianBlur***Matsrc, Matdst, Sizeksize, doublesigmaX* It blurs an image using a Gaussian filter.
6	**integral***Matsrc, Matsum* It calculates the integral of an image.

Example

The following example demonstrates the use of Imgproc class to apply Prewitt operator to an image of Grayscale.

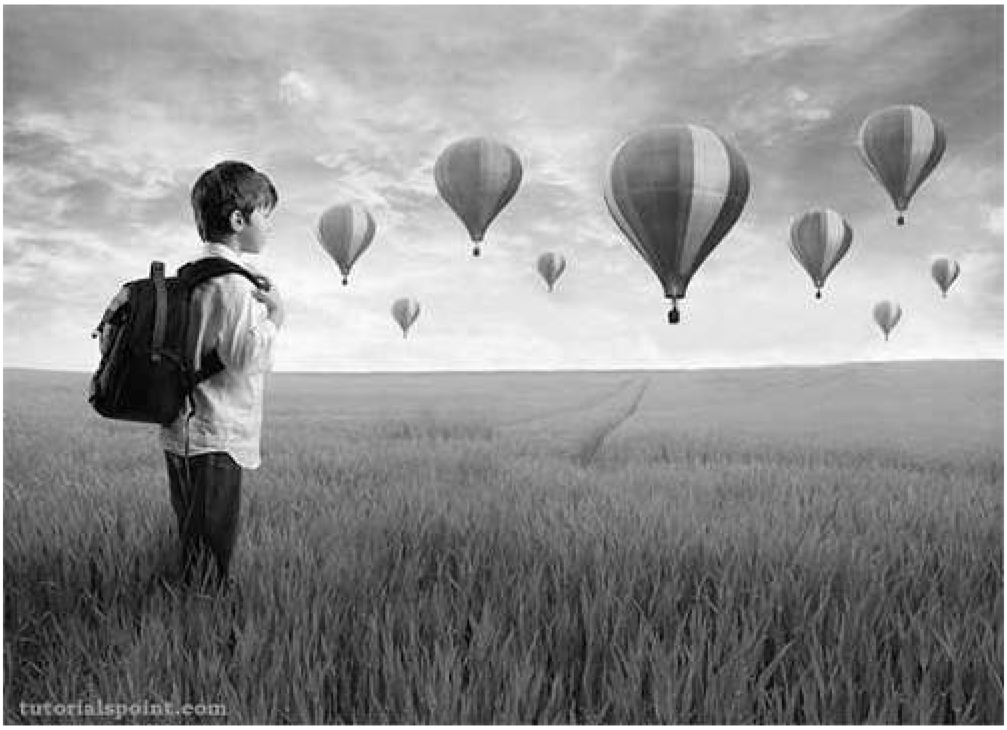
```
import org.opencv.core.Core;
import org.opencv.core.CvType;
import org.opencv.core.Mat;

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

public class convolution {
   public static void main( String[] args ){
      try {
         int kernelSize = 9;
         System.loadLibrary( Core.NATIVE_LIBRARY_NAME );

         Mat source = Highgui.imread("grayscale.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,-1);
               put(0,1,0);
               put(0,2,1);

               put(1,0-1);
               put(1,1,0);
               put(1,2,1);
```

```
                    put(2,0,-1);
                    put(2,1,0);
                    put(2,2,1);
                }
            };

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

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

Output

When you execute the given code, the following output is seen:

Original Image



This original image is convolved with the Prewitt operator of vertical edges as given below:

Vertical direction

-1	0	1
-1	0	1
-1	0	1

Convolved Image *VerticalDirection*

This original image has also been convolved with the Prewitt operator of horizontal edges, which is given below:

Horizontal Direction

-1	-1	-1
0	0	0
1	1	1

Convolved Image$HorizontalDirection$