Oblig 8 i 6121 hausten 2018

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Oppgave 1

```
1  import ij.*;
2  import ij.process.*;
3  import ij.gui.*;
4  import java.util.*;
5  import java.awt.*;
6  import ij.plugin.filter.*;
7  import ij.process.*;
8  import java.lang.Math.*;
9
10 public class SobelOperator_Plugin implements PlugInFilter {
11
12     ImagePlus imp;
13     int pixelX = 0;
14     int pixelY = 0;
15
16     public int setup(String arg, ImagePlus imp) {
17         this.imp = imp;
18         return DOES_8G;
19     }
20
21     public void run(ImageProcessor ip) {
22
23         int sobelX[][] = {
24             {-1, 0, 1},
25             {-2, 0, 2},
26             {-1, 0, 1}
27         };
28
29         int sobelY[][] = {
30             {-1, -2, -1},
31             {0, 0, 0},
32             {1, 2, 1}
33         };
34
```

```
35          int width = ip.getWidth();
36          int height = ip.getHeight();
37          int resultat = 0;
38          int resultat2 = 0;
39
40
41          ImageProcessor ip2 = new ByteProcessor(width, height);
42          ImageProcessor ip3 = new ByteProcessor(width, height);
43
44          for (int x = 1; x < width - 2; x++) {
45              for (int y = 1; y < height - 2; y++) {
46                     resultat = 0;
47                     pixelX = 0;
48                     pixelY = 0;
49                       resultat2 =0;
50                  for (int j = -1; j <= 1; j++) {
51                      for (int i = -1; i <= 1; i++) {
52                          int hentPx = ip.getPixel(x+i, y+j);
53                          // kjøres gjennom konvelusjon
54                          pixelX += sobelX[1+j][1+i] * hentPx;
55                          pixelY += sobelY[1+j][1+i] * hentPx;
56                      }
57                  }
58                  resultat = (int) Math.sqrt((pixelX * pixelX) +
    (pixelY * pixelY));
59                  resultat2 =
    (int)(Math.atan2(pixelY,pixelX)*180/Math.PI);
60                  ip2.putPixel(x, y, resultat);
61                  ip3.putPixel(x,y,resultat2);
62              }
63          }
64               ImagePlus im = new ImagePlus("Sobel
    Strength",ip2);
65              im.show();
66              ImagePlus im2 = new ImagePlus("Sobel",ip3);
67              im2.show();
68      }
69  }
```

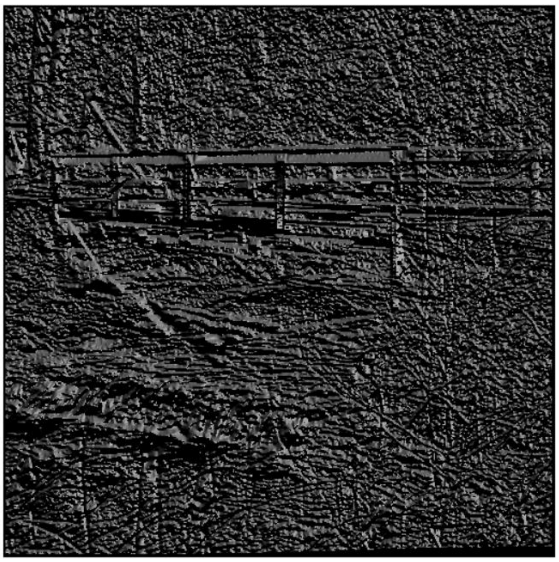
Oppgave 2

```
 1  import ij.*;
 2  import ij.process.*;
 3  import ij.gui.*;
 4  import java.util.*;
 5  import java.awt.*;
 6  import ij.plugin.filter.*;
 7  import ij.process.*;
 8  import java.lang.Math.*;
 9  import java.awt.Color.*;
10
11  public class SobelOperatorColor_Plugin implements PlugInFilter
    {
12
13      ImagePlus imp;
14      int pixelX = 0;
15      int pixelY = 0;
16      Color color;
17
18      public int setup(String arg, ImagePlus imp) {
19          this.imp = imp;
20          return DOES_8G;
21      }
22
23      public void run(ImageProcessor ip) {
24
25          int sobelX[][] = {
26              {-1, 0, 1},
27              {-2, 0, 2},
28              {-1, 0, 1}
29          };
30
31          int sobelY[][] = {
32              {-1, -2, -1},
33              {0, 0, 0},
34              {1, 2, 1}
35          };
36
37          int width = ip.getWidth();
38          int height = ip.getHeight();
39          int resultat = 0;
40          int resultat2 = 0;
41
42
43
44          ImageProcessor ip2 = new ColorProcessor(width,height);
45
```

```
46          for (int x = 1; x < width - 2; x++) {
47              for (int y = 1; y < height - 2; y++) {
48                     resultat = 0;
49                     pixelX = 0;
50                     pixelY = 0;
51                       resultat2 =0;
52                  for (int j = -1; j <= 1; j++) {
53                      for (int i = -1; i <= 1; i++) {
54                          int hentPx = ip.getPixel(x+i, y+j);
55                          // kjøres gjennom konvelusjon
56                          pixelX += sobelX[1+j][1+i] * hentPx;
57                          pixelY += sobelY[1+j][1+i] * hentPx;
58                      }
59                  }
60                  resultat = (int) Math.sqrt((pixelX * pixelX) +
    (pixelY * pixelY));
61                  resultat2 =
    (int)(Math.atan2(pixelY,pixelX)*180/Math.PI);
62                  color = (color.getHSBColor(resultat2, resultat,
    50));
63                  ip2.setColor(color);
64                  ip2.drawPixel(x,y);
65              }
66          }
67               ImagePlus im = new ImagePlus("Sobel
    Strength",ip2);
68              im.show();
69
70      }
71  }
```

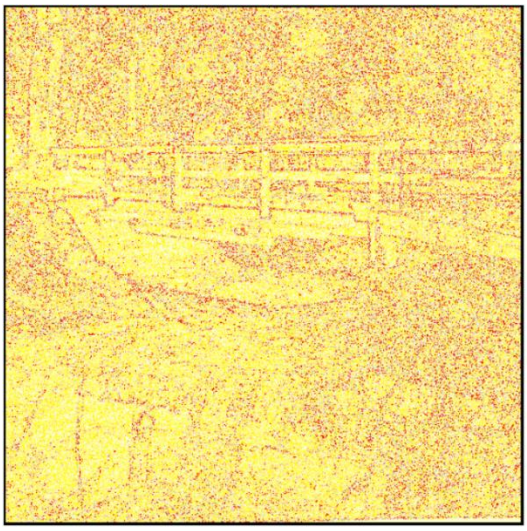
Oppgave 3

Originale bilde: Bridge.gif

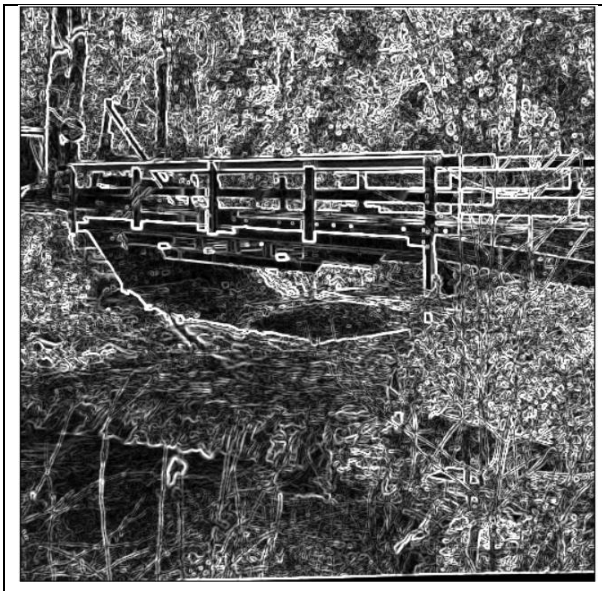


Gradient Retning

Gradient Styrke



Fargebilde

 "Process->Find Edges" i ImageJ.	