

# Image and Video Processing - Task 1

## Prewitt Edge Detector and Nonmaxima Suppression

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### Read and setup

```
clear all; clc;

% Parameters
imname = 'motor.png';

img = uint8(imread(imname));
figure;
imshow(img);
title('Input image');
```

Input image



### Setting up

```
% Prewitt filter mask
xmask = [-1 0 1;
        -1 0 1;
        -1 0 1];
```

```

ymask = [-1 -1 -1;
         0  0  0;
         1  1  1];

% Converting the image
img = double(im2gray(img));
gradients = zeros(size(img));

% Window size
kernel_size = 2;

```

## Running the filter

```

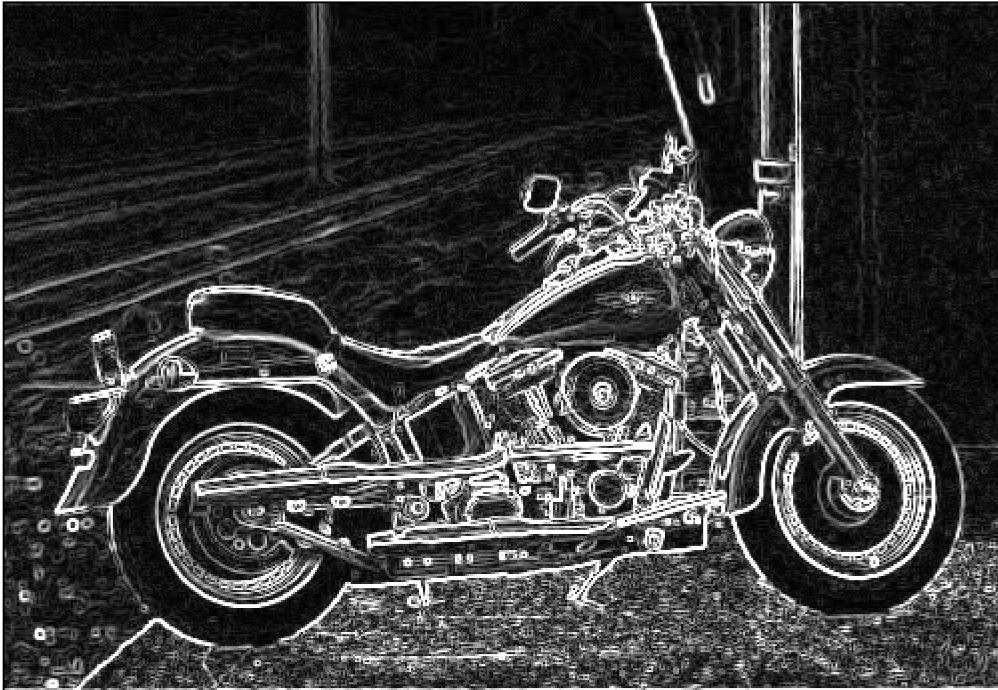
for i = 1:size(img, 1) - kernel_size
    for j = 1:size(img, 2) - kernel_size
        % Calculating the gradients
        Gx = sum(sum(xmask.*img(i:i+kernel_size, j:j+kernel_size)));
        Gy = sum(sum(ymask.*img(i:i+kernel_size, j:j+kernel_size)));

        gradients(i+1, j+1) = sqrt(Gx.^2 + Gy.^2); % Gradient norms
    end
end

% Displaying Filtered Image
gradients = uint8(gradients);
figure;
imshow(gradients);
title('Gradient magnitudes');

```

### Gradient magnitudes



### Nonmaxima suppression

```
% Matrices to compare values from the main direction
```

```
imat = [-2 -2 -2 0 0 2 0 2;  
        -2 0 2 -2 2 -2 2 2];
```

```
jmat = [-1 -1 -1 0 0 1 0 1;  
        -1 0 1 -1 1 -1 1 1];
```

```
for i = 3:size(gradients, 1) - 2  
    for j = 3:size(gradients, 2) - 2  
        m_c = gradients(i, j);  
        for k = 1:8  
            coord1_x = imat(1, k);  
            coord1_y = imat(2, k);  
            coord2_x = jmat(1, k);  
            coord2_y = jmat(2, k);  
  
            m_a = gradients(i-coord1_x, j-coord1_y);  
            m_b = gradients(i-coord2_x, j-coord2_y);  
  
            if(m_a > m_c || m_b > m_c)  
                gradients(i, j) = 0;  
            end  
        end  
    end  
end
```

```
        end
    end
end
end
```

```
% Displaying Output Image
result = imbinarize(gradients);

fig = figure;
imshow(result);
title('Edge detection result');
saveas(fig, strcat('Prewitt_', imname));
```

Edge detection result

