

```

1. function [res] = cov(img,kernel)
se_len=size(kernel,1);
n_l=floor(se_len/2);
[width,height]=size(img);
% pad to deal with edge pixels
l_pad=padarray(img,[n_l,n_l],'both');
% result pic
res=zeros(width,height);
for i=1:width
    for j=1:height
        % extract subimage filtered by kernel
        Block=l_pad(i:i+2*n_l,j:j+2*n_l);
        C=Block.*kernel;
        % convolution
        res(i,j)=sum(sum(C))/sum(sum(abs(kernel)));
    end
end
end

```

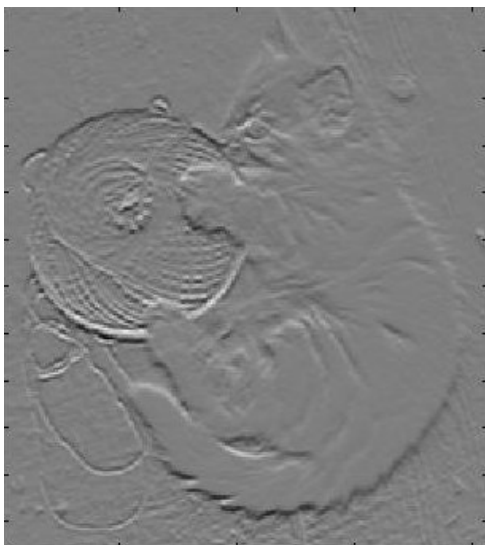


2-1 apply average smoothing kernel

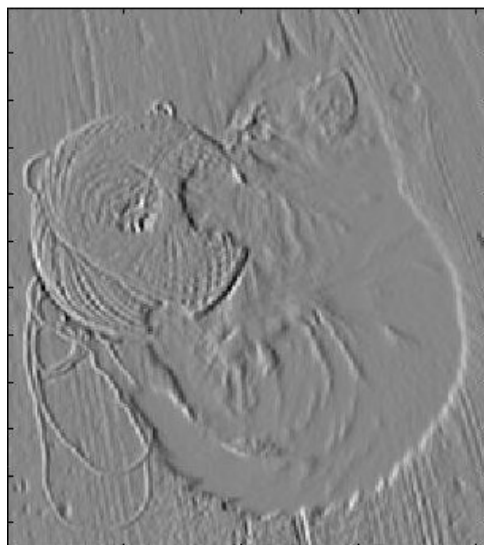


2-2 apply weighted average smoothing kernel

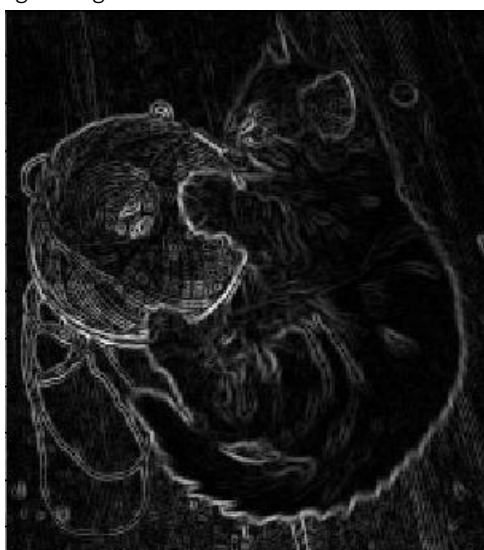
2.



2-1 horizontal edge image

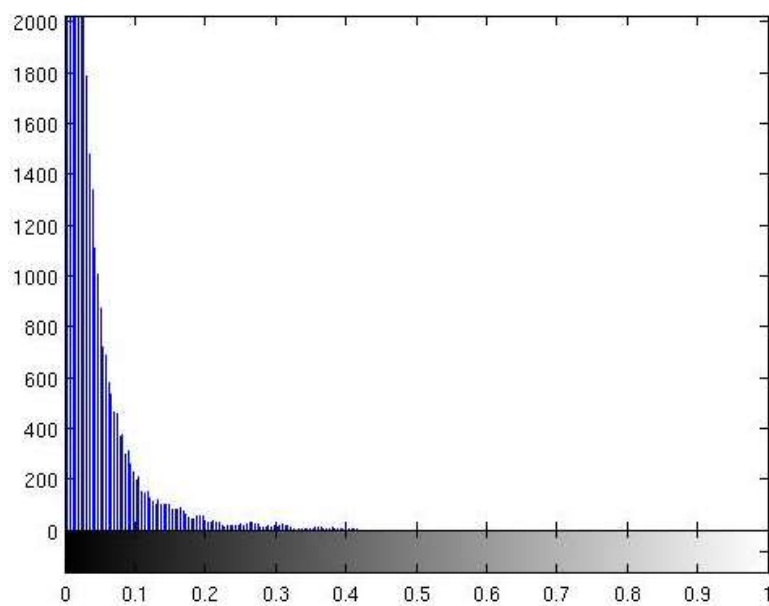


2-2 vertical edge image



2-3 edge strength image

3.



2-4 image histogram of edge strength image



2-5 threshold=0.1 result



2-6 threshold=0.15 result



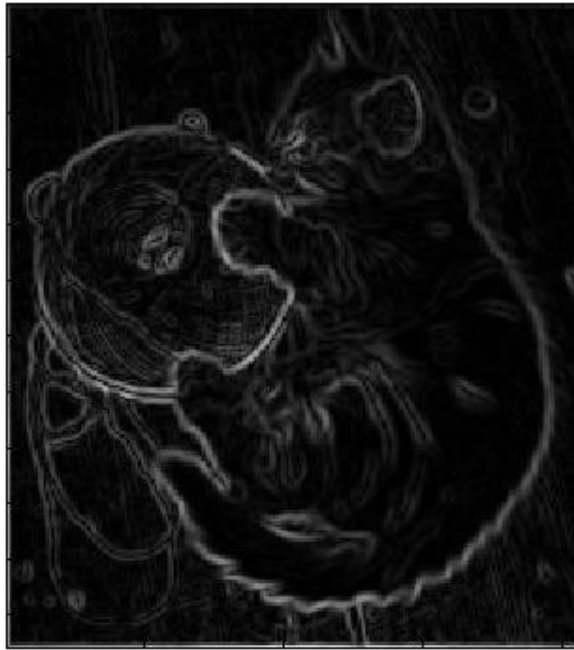
2-7 threshold=0.2 result



2-8 threshold=0.25 result

3.1 Can you find a threshold value that gives the edges of the cat, but not the patterns in the fur, or the wood-grain?

Edges of fur and wood grain have similar edge strength with that of the cat, so there is not an ideal threshold that can filter out patterns in the fur or the wood-grain.



2-9 Edge strength image after applying weighted mean kernel to the image



2-10 threshold=0.1 result on blurred image



2-11 threshold=0.15 result on blurred image



2-12 threshold=0.2 result on blurred image

4.1 What difference has the weighted-mean smoothing made to the edges detected?
Some minor edges disappeared; detected edges generally get dimmer.