EXPERIMENT-8

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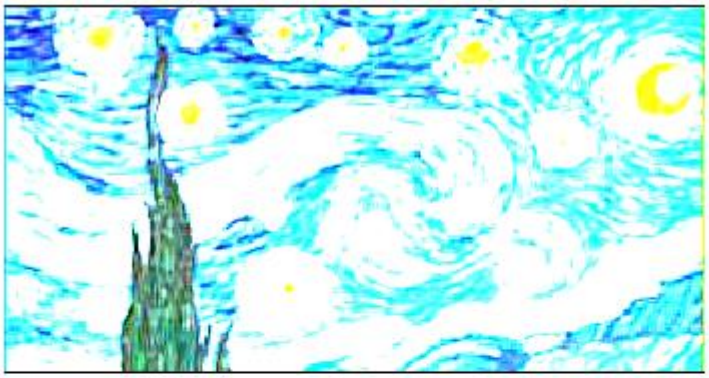
CODE:

```
clc
clear
close all;
img = imread("download.jpeg");
h = 1/9*[1 1 1;1 1 1;1 1 1];
l = [-1 -1 -1;-1 8 -1;-1 -1 -1];
h = double(h); l = double(l);
img = double(img);
[m,n] = size(img);
y = zeros(size(img));
z = zeros(size(img));
shs = zeros(size(img));
sms = zeros(size(img));
for i=2:m-1
    for j=2:n-1
        y(i,j) = sum(sum(img(i-1:i+1,j-1:j+1).*h));
        z(i,j) =sum(sum(img(i-1:i+1,j-1:j+1).*l));
        shs(i,j) =sum(sum(y(i-1:i+1,j-1:j+1).*l));
        sms(i,j) =sum(sum(z(i-1:i+1,j-1:j+1).*h));
    end
end
psnr_m = psnr(y, img);
ssim_m = ssim(y, img);
psnr_l = psnr(z, img);
ssim_l = ssim(z, img);
psnr_shs = psnr(shs, img);
ssim_shs = ssim(shs, img);
psnr_sms = psnr(sms, img);
ssim_sms = ssim(sms, img);
fprintf('PSNR of smoothed image: %f\n', psnr_m);
fprintf('SSIM of smoothed image: %f\n', ssim_m);
fprintf('PSNR of sharpened image: %f\n', psnr_l);
fprintf('SSIM of sharpened image: %f\n', ssim_l);
fprintf('PSNR of sharpening on smooth image: %f\n', psnr_shs);
fprintf('SSIM of sharpening on smooth image: %f\n', ssim_shs);
fprintf('PSNR of smoothening on sharp image: %f\n', psnr_sms);

fprintf('SSIM of smoothening on sharp image: %f\n', ssim_sms);
figure;
subplot(3, 1, 1), imshow(uint8(img)), title('Original Image');
subplot(3, 1, 2), imshow(uint8(y)), title('Smoothed Image');
subplot(3, 1, 3), imshow(uint8(z)), title('Sharpened Image');
figure;
subplot(2,1,1),imshow(uint8(shs)),title("sharpening on smooth image");
subplot(2,1,2),imshow(uint8(sms)),title("smoothening on sharp image");
```

OUTPUT:

sharpening on smooth image



smoothening on sharp image