VIT®

Vellore Institute of Technology

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DIGITAL IMAGE PROCESSING

LAB-8

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EXPERIMENT:

USE **"STRAYY NIGHT"** AS INPUT IMAGE, DOWNLOAD FROM GOOGLE. DO COLOR
IMAGE SMOOTHENINH USING MEAN FILTER, VISUALIZE IT. MEASURE THE QUALITY
OF THE OUTPUT USING (PSNR AND SSIM) ONE LINE COMAND IN MATLAB, ALSO DO COLOR SHARPENING USING LAPLACIAN FILTER. EVALUATE YOUR OUTPUT USING VISUALIZATION PSNR, SSIM.

FINALLY APPLY SHARPENNING FILTER ON SMOOOTHENING IMAGE, EVALUATE AND DO VICE VERSA TOO.

TOTALLY 4 OUTPUTS.

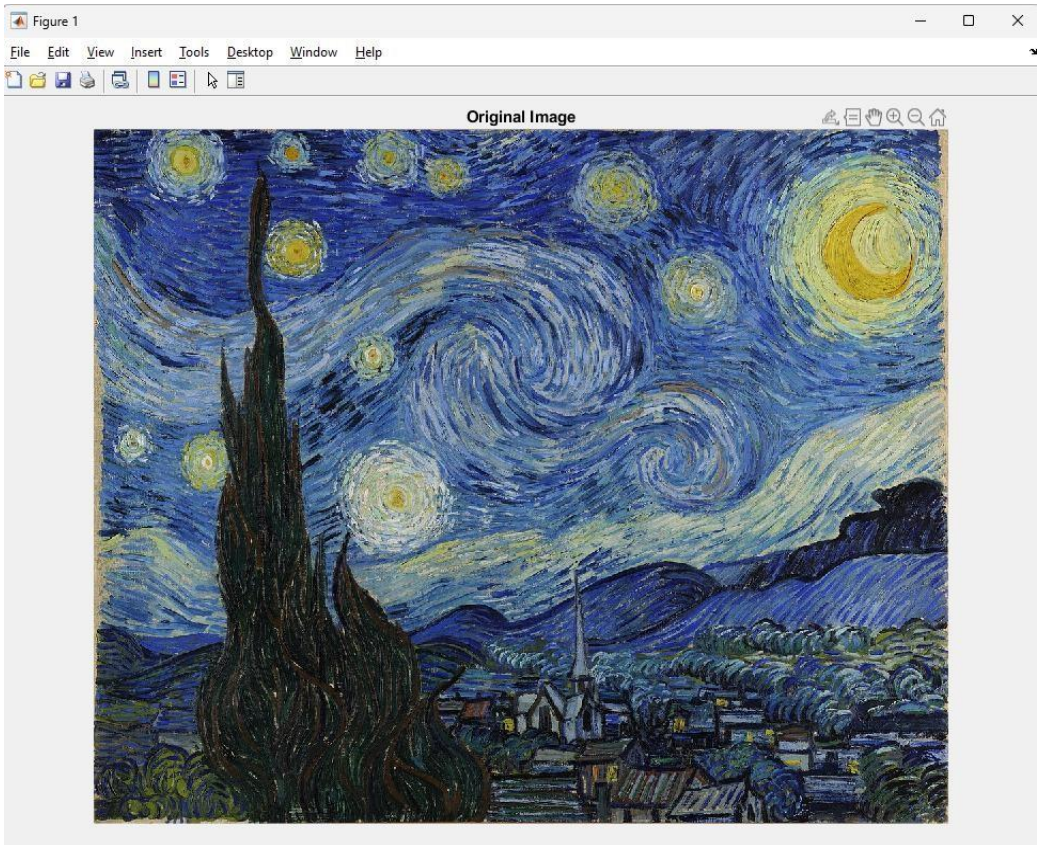
CODE:

```
image ="C:\Users\dsplab\Downloads\Van_Gogh_-_Starry_Night_-
_Google_Art_Project.jpg"
; img = imread(image);
% Display original image
figure(1); imshow(img);
title('Original Image');
% Color image smoothing using mean filter kernel_size = 5;
smoothed_img = imfilter(img, ones(kernel_size) /
kernel_size^2, 'replicate');
% Display smoothed image
figure(2);
imshow(smoothed_img);
title('Smoothed Image'); %
Measure PSNR and SSIM for
smoothed image psnr_smoothed =
psnr(smoothed_img, img);
ssim_smoothed =
ssim(smoothed_img, img); %
Display PSNR and SSIM values
fprintf('PSNR of smoothed
image: %.2f dB\n',
psnr_smoothed); fprintf('SSIM
of smoothed image: %.2f\n',
ssim_smoothed);
% Color sharpening using Laplacian filtering
laplacian_kernel = [-1 -1 -1; -1 8 -1; -1 -1 -1];
sharpened_img = img - imfilter(img, laplacian_kernel, 'replicate');
% Display sharpened image
figure(3);
imshow(sharpened_img);
title('Sharpened Image');
% Measure PSNR and SSIM for sharpened image
psnr_sharpened = psnr(sharpened_img, img);
ssim_sharpened = ssim(sharpened_img, img);
% Display PSNR and SSIM values fprintf('PSNR of sharpened
image: %.2f dB\n', psnr_sharpened); fprintf('SSIM of
sharpened image: %.2f\n', ssim_sharpened);
% Sharpening on smoothed image
sharpened_smoothed = smoothed_img -
imfilter(smoothed_img, laplacian_kernel, 'replicate'); %
Display sharpened smoothed image figure(4);
imshow(sharpened_smoothed); title('Sharpened Smoothed
Image');
% Measure PSNR and SSIM for sharpened smoothed image
psnr_sharpened_smoothed = psnr(sharpened_smoothed, img);
ssim_sharpened_smoothed = ssim(sharpened_smoothed, img);
% Display PSNR and SSIM values
fprintf('PSNR of sharpened smoothed image: %.2f dB\n',
psnr_sharpened_smoothed);
```

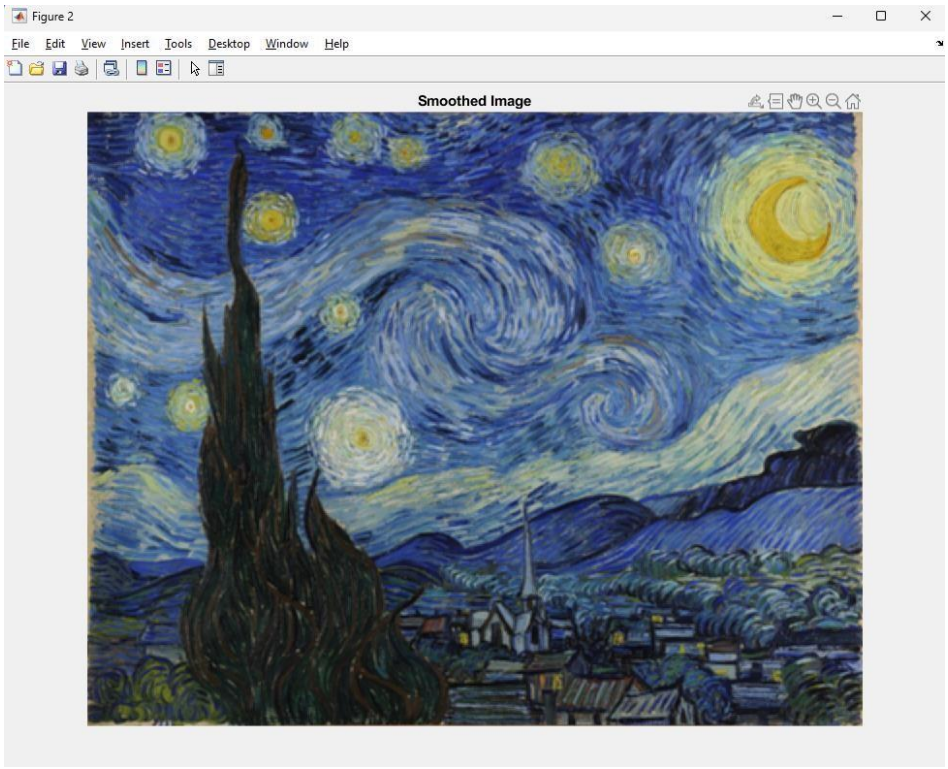
```
fprintf('SSIM of sharpened smoothed image:
%.2f\n', ssim_sharpened_smoothed); % Smoothing on
sharpened image
smoothed_sharpened = imfilter(sharpened_img, ones(kernel_size)
/ kernel_size^2, 'replicate'); % Display smoothed sharpened
image figure(5); imshow(smoothed_sharpened); title('Smoothed
Sharpened Image');
% Measure PSNR and SSIM for smoothed sharpened image
psnr_smoothed_sharpened = psnr(smoothed_sharpened, img);
ssim_smoothed_sharpened = ssim(smoothed_sharpened, img);
% Display PSNR and SSIM values
fprintf('PSNR of smoothed sharpened image: %.2f dB\n',
psnr_smoothed_sharpened);
fprintf('SSIM of smoothed sharpened image: %.2f\n',
ssim_smoothed_sharpened)
```

OUTPUT:

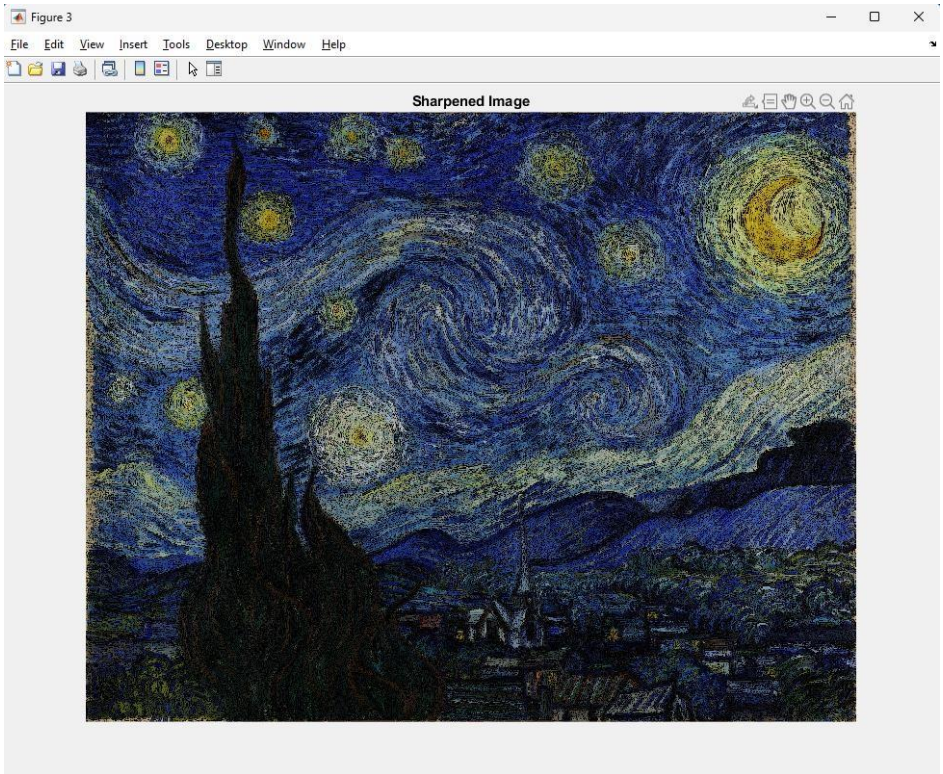
ORIGINAL IMAGE:



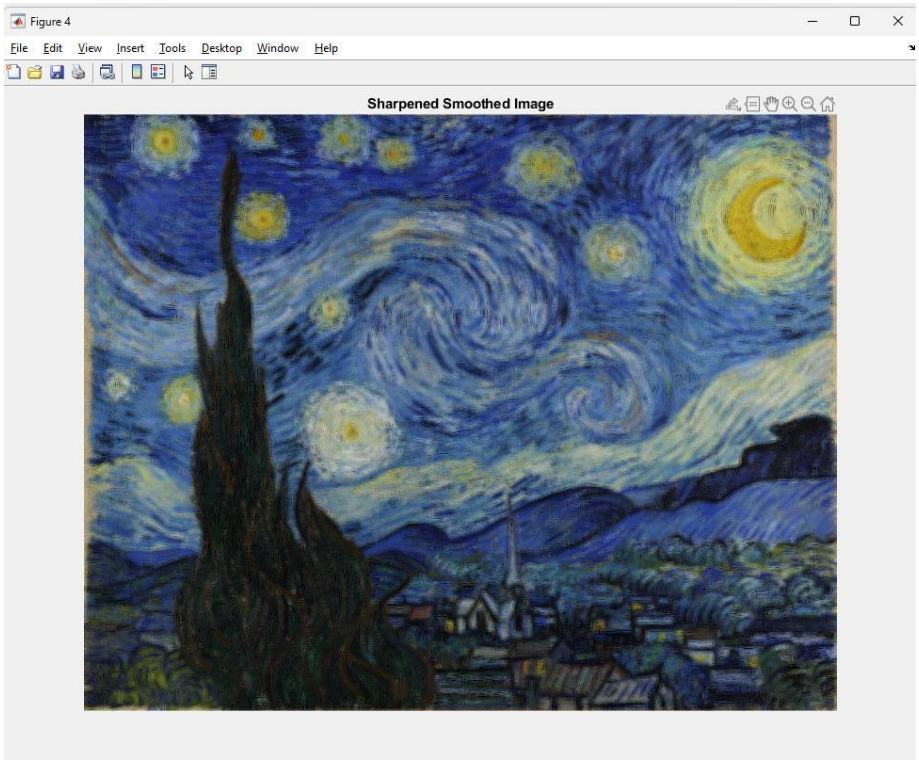
SMOOTHED IMAGE:



SHARPENED IMAGE:



SHARPENED SMOOTHED IMAGE:



SMOOTHED SHARPENED IMAGE:

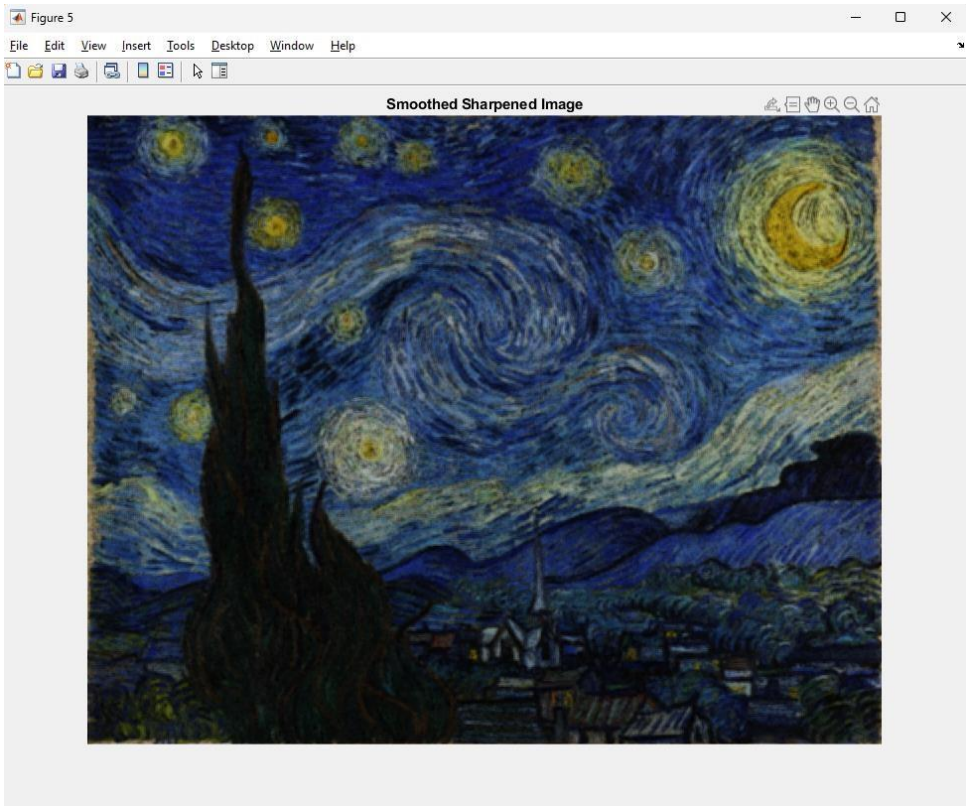


Figure 5
File Edit View Insert Tools Desktop Window Help
Smoothed Sharpened Image

ALL IMAGES:

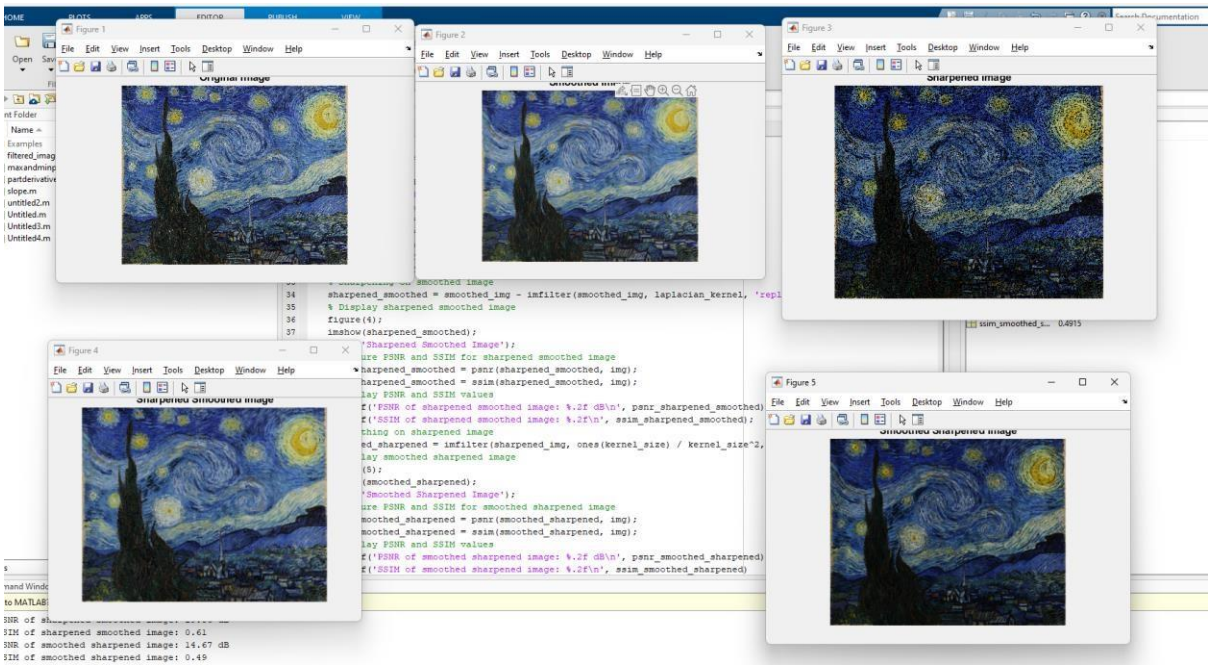


Figure 1
Figure 2
Figure 3
Figure 4
Figure 5
Sharpened Image
Sharpened Smoothed Image
Smoothed Sharpened Image
SNR of sharpened smoothed image: 0.61
SNR of smoothed sharpened image: 14.67 dB
SIM of smoothed sharpened image: 0.49