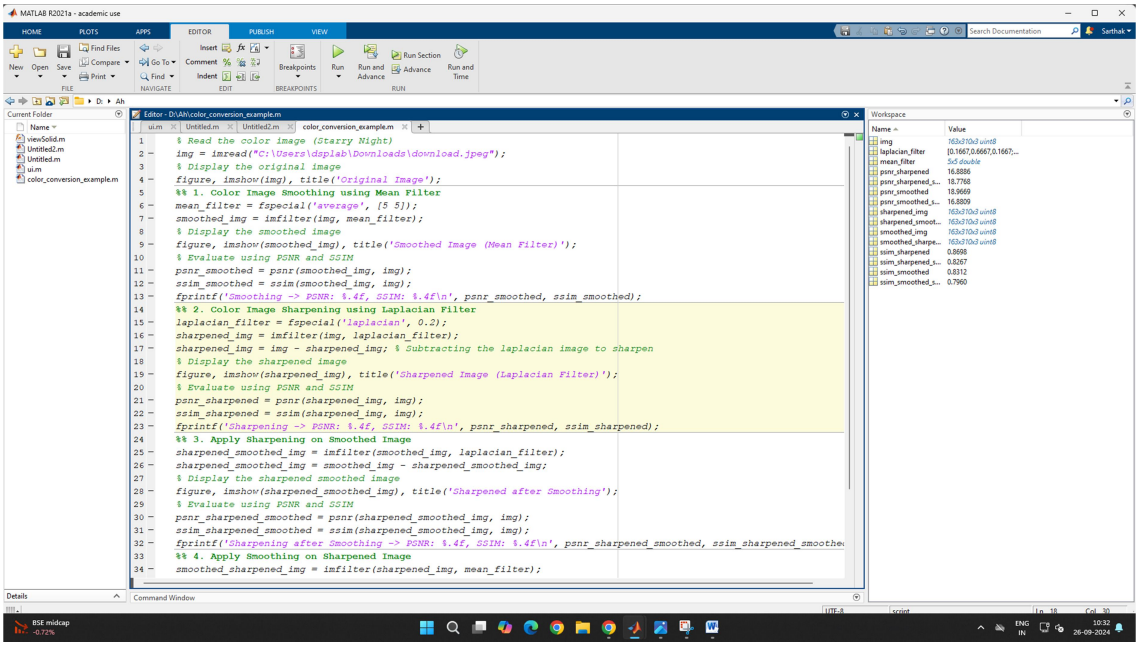
EXPERIMENT 8

K PRANAV KUMAR

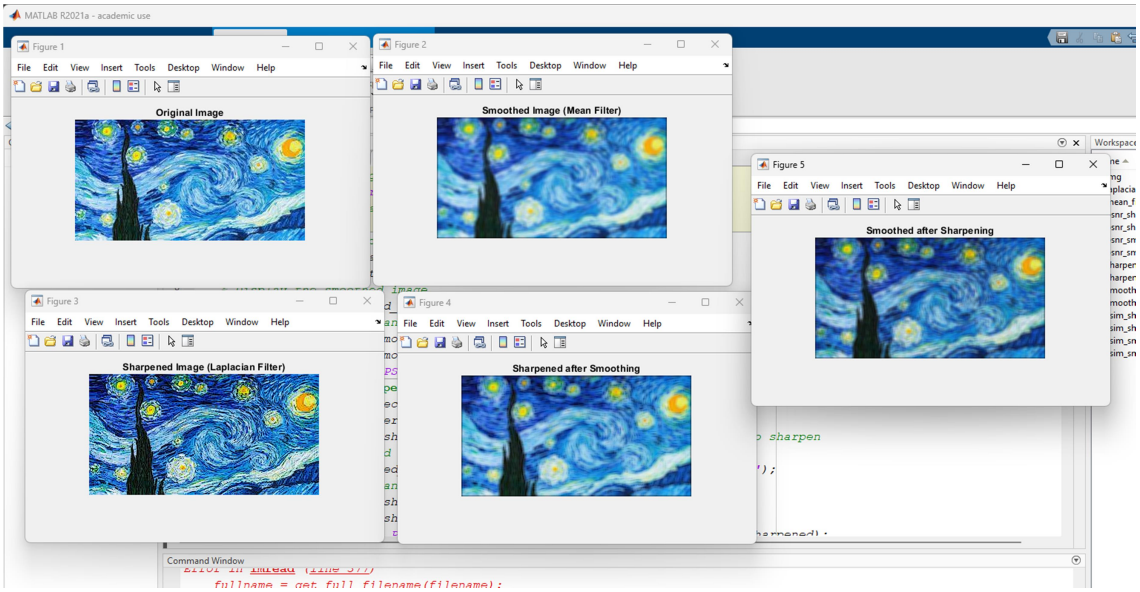
21BEC1507

Question:

Use “strayy night” as input image- download from Google. Do colour image smoothing using mean filter, visualise it. Measure the quality of the output using PSNR and SSIM (one line command in mat lab). Also, do colour sharpening using Laplacian filtering. Evaluate your output using visualisation, PSNR, SSIM.



```
% Read the color image (Starry Night)
img = imread("C:\Users\dsplab\Downloads\download.jpeg");
% Display the original image
figure, imshow(img), title('Original Image');
%% 1. Color Image Smoothing using Mean Filter
mean_filter = fspecial('average', [5 5]);
smoothed_img = imfilter(img, mean_filter);
% Display the smoothed image
figure, imshow(smoothed_img), title('Smoothed Image (Mean
Filter)');
% Evaluate using PSNR and SSIM
psnr_smoothed = psnr(smoothed_img, img);
ssim_smoothed = ssim(smoothed_img, img);
fprintf('Smoothing -> PSNR: %.4f, SSIM: %.4f\n',
psnr_smoothed, ssim_smoothed);
%% 2. Color Image Sharpening using Laplacian Filter
laplacian_filter = fspecial('laplacian', 0.2);
sharpened_img = imfilter(img, laplacian_filter);
sharpened_img = img - sharpened_img; % Subtracting the
laplacian image to sharpen
% Display the sharpened image
figure, imshow(sharpened_img), title('Sharpened Image
(Laplacian Filter)');
% Evaluate using PSNR and SSIM
psnr_sharpened = psnr(sharpened_img, img);
ssim_sharpened = ssim(sharpened_img, img);
fprintf('Sharpening -> PSNR: %.4f, SSIM: %.4f\n',
psnr_sharpened, ssim_sharpened);
%% 3. Apply Sharpening on Smoothed Image
sharpened_smoothed_img = imfilter(smoothed_img,
laplacian_filter);
sharpened_smoothed_img = smoothed_img -
sharpened_smoothed_img;
% Display the sharpened smoothed image
figure, imshow(sharpened_smoothed_img), title('Sharpened after
Smoothing');
% Evaluate using PSNR and SSIM
psnr_sharpened_smoothed = psnr(sharpened_smoothed_img, img);
ssim_sharpened_smoothed = ssim(sharpened_smoothed_img, img);
fprintf('Sharpening after Smoothing -> PSNR: %.4f, SSIM:
%.4f\n', psnr_sharpened_smoothed, ssim_sharpened_smoothed);
%% 4. Apply Smoothing on Sharpened Image
smoothed_sharpened_img = imfilter(sharpened_img, mean_filter);
% Display the smoothed sharpened image
figure, imshow(smoothed_sharpened_img), title('Smoothed after
Sharpening');
% Evaluate using PSNR and SSIM
psnr_smoothed_sharpened = psnr(smoothed_sharpened_img, img);
ssim_smoothed_sharpened = ssim(smoothed_sharpened_img, img);
fprintf('Smoothing after Sharpening -> PSNR: %.4f, SSIM:
%.4f\n', psnr_smoothed_sharpened, ssim_smoothed_sharpened);
```


MATLAB R2021a - academic use
Figure 1
File Edit View Insert Tools Desktop Window Help
Original Image
Figure 2
File Edit View Insert Tools Desktop Window Help
Smoothed Image (Mean Filter)
Figure 5
File Edit View Insert Tools Desktop Window Help
Smoothed after Sharpening
Figure 3
File Edit View Insert Tools Desktop Window Help
Sharpened Image (Laplacian Filter)
Figure 4
File Edit View Insert Tools Desktop Window Help
Sharpened after Smoothing
Command Window