

QUESTION 9

CS663 (DIGITAL IMAGE PROCESSING) ASSIGNMENT 2

ATISHAY JAIN (210050026)
CHESHTA DAMOR (210050040)
KANAD SHENDE (210050078)

210050026@iitb.ac.in

210050040@iitb.ac.in

210050078@iitb.ac.in

Contents

| | | |
|----------|--|----------|
| I | Question 9 | 1 |
| 1 | Original Images | 1 |
| 2 | Local histogram equalization Images | 2 |
| 2.1 | Window-Size = 7 | 2 |
| 2.2 | Window-Size = 31 | 2 |
| 2.3 | Window-Size = 51 | 3 |
| 2.4 | Window-Size = 71 | 3 |
| 3 | Global histogram equalization Images | 4 |
| 4 | Comparison between Global and Local Histogram Equalization Images | 5 |
| 4.1 | Image LC1 | 5 |
| 4.2 | Image LC2 | 6 |
| 5 | Conclusion | 6 |

Question 9

PART

I

Problem 1

Implement local histogram equalization of sizes 7×7 , 31×31 , 51×51 , 71×71 on the images 'LC1.jpg' and 'LC2.jpg' from the homework folder. Comment on your results in your report and compare it to global histogram equalization, which you can use from the image processing toolbox of MATLAB. Point out regions where the local method produces better local contrast than the global histogram equalization.

SECTION 1

Original Images



Figure 1. Original images

SECTION 2

Local histogram equalization Images

SUBSECTION 2.1

Window-Size = 7



Figure 2. Local Histogram Equalization with window size 7

SUBSECTION 2.2

Window-Size = 31

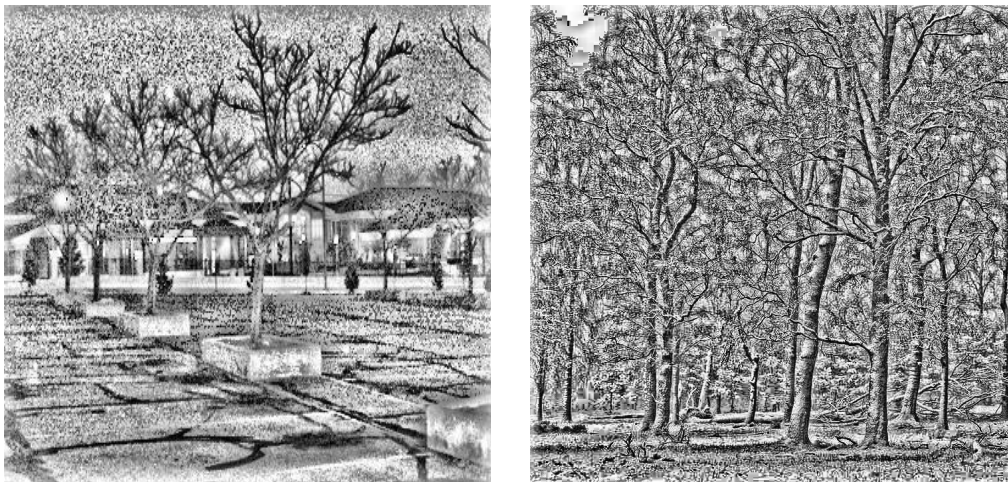


Figure 3. Local Histogram Equalization with window size 31

SUBSECTION 2.3

Window-Size = 51

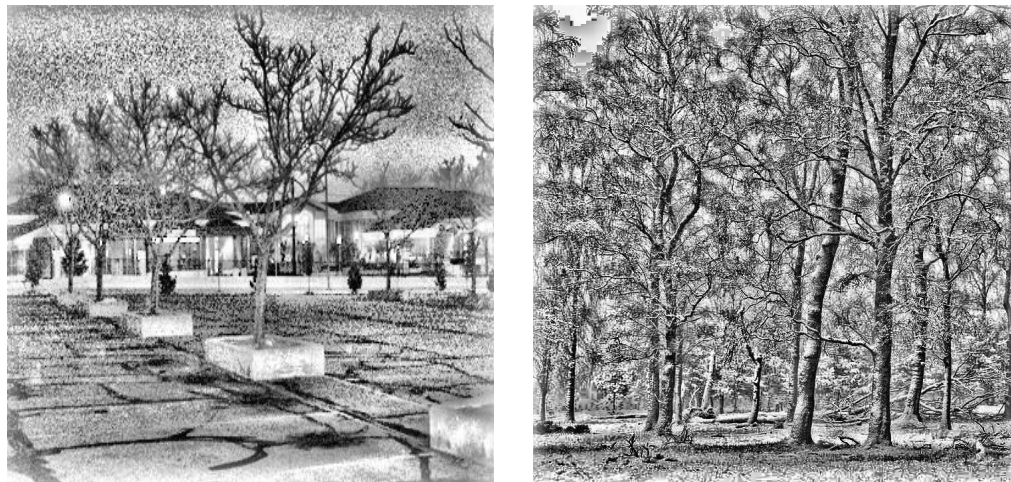


Figure 4. Local Histogram Equalization with window size 51

SUBSECTION 2.4

Window-Size = 71

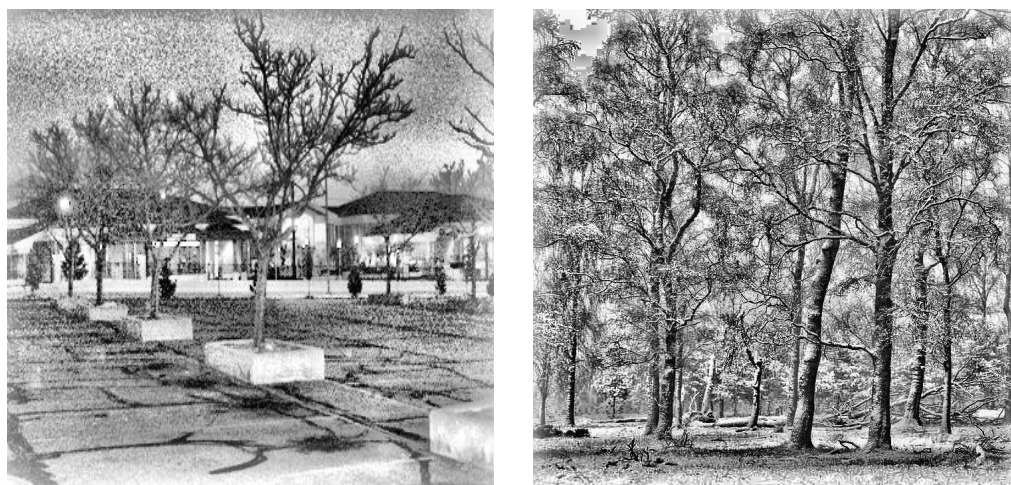


Figure 5. Local Histogram Equalization with window size 71

SECTION 3

Global histogram equalization Images



Figure 6. Global Histogram Equalization

SECTION 4

Comparison between Global and Local Histogram Equalization Images

Regions where the local method produces better local contrast will typically be areas with varying illumination, textures, or details that are unevenly distributed in the image. Local histogram equalization can adapt to the characteristics of these regions and enhance them more effectively than global equalization, which treats the entire image as a single entity.

SUBSECTION 4.1

Image LC1



Figure 7. Contrast differences shown by red and green circles

SUBSECTION 4.2

Image LC2



Figure 8. Contrast differences shown by red and green circles

SECTION 5

Conclusion

- When you use a larger window size in local histogram equalization, it enhances the contrast more effectively. So, if you use a window size of 71, the resulting image will have more clarity and details compared to smaller window sizes.
- Local histogram equalization adapts to the characteristics of small regions within the image. Instead of applying a single global transformation to the entire image, it computes and applies transformations locally, allowing for better enhancement of local features.
- : Unlike global histogram equalization, which sometimes goes too far by making flat areas too extreme and noisy, local histogram equalization is more balanced.