Homomorphic Filtering

Steps involved

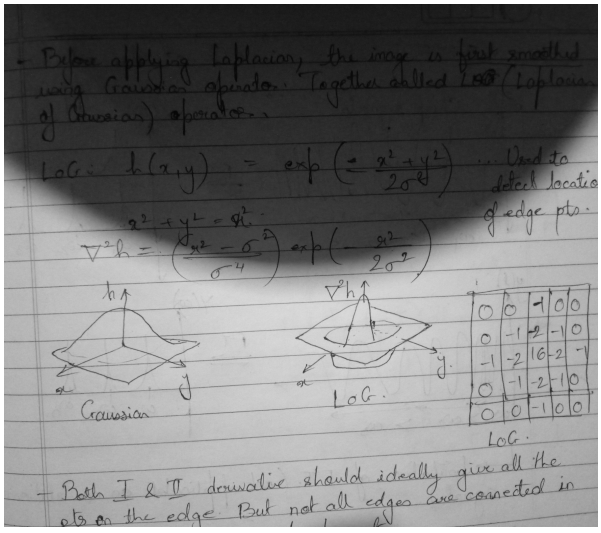
Filter H(u, v):

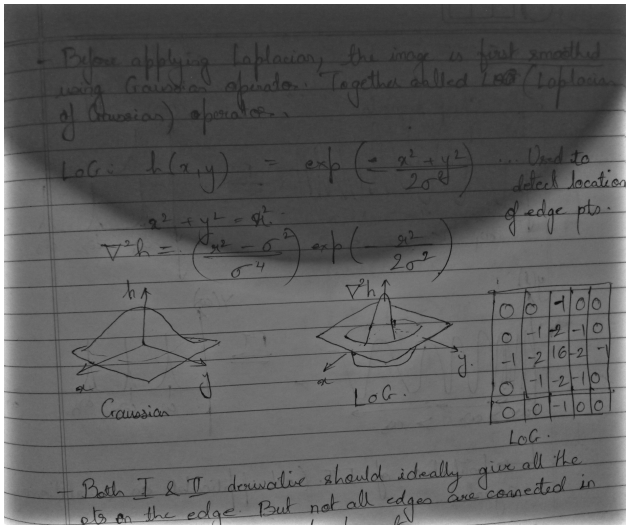
$$H(u,v) = (\gamma_H - \gamma_L)\left[1 - e^{-c[D^2(u,v)/D_0^2]}\right] + \gamma_L$$

*Images up till here taken from Digital Image Processing, Gonzales and Woods.

If gammaH > 1 and gammaL < 1, the filter function tends to attenuate the contribution made by the low frequencies (illumination) and amplify the contribution made by high frequencies (reflectance). The net result is simultaneous dynamic range compression and contrast enhancement.

Results





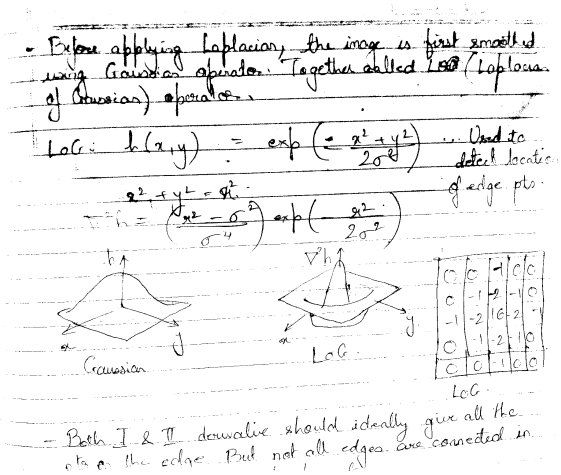


Figure 1. (a) Original Image clicked on smartphone. (b) Filtered image. gammaH = 3, gammaL = 0.9, c = 0.3 (c) Thresholding operation on the image in (b), threshold = 53.

I learned the concept of homomorphic filters and got hands-on experience through this small experiment.

Code

Here is the link to the code.

References

- Digital Image Processing, Gonzales and Woods
- https://stackoverflow.com/questions/24731810/segmenting-license-plate-characters