



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A’ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**COURSE NAME : 19EC513 – IMAGE PROCESSING AND COMPUTER
VISION**

III YEAR / V SEMESTER

Unit II- IMAGE ENHANCEMENT AND RESTORATION

Topic : Local Histogram processing

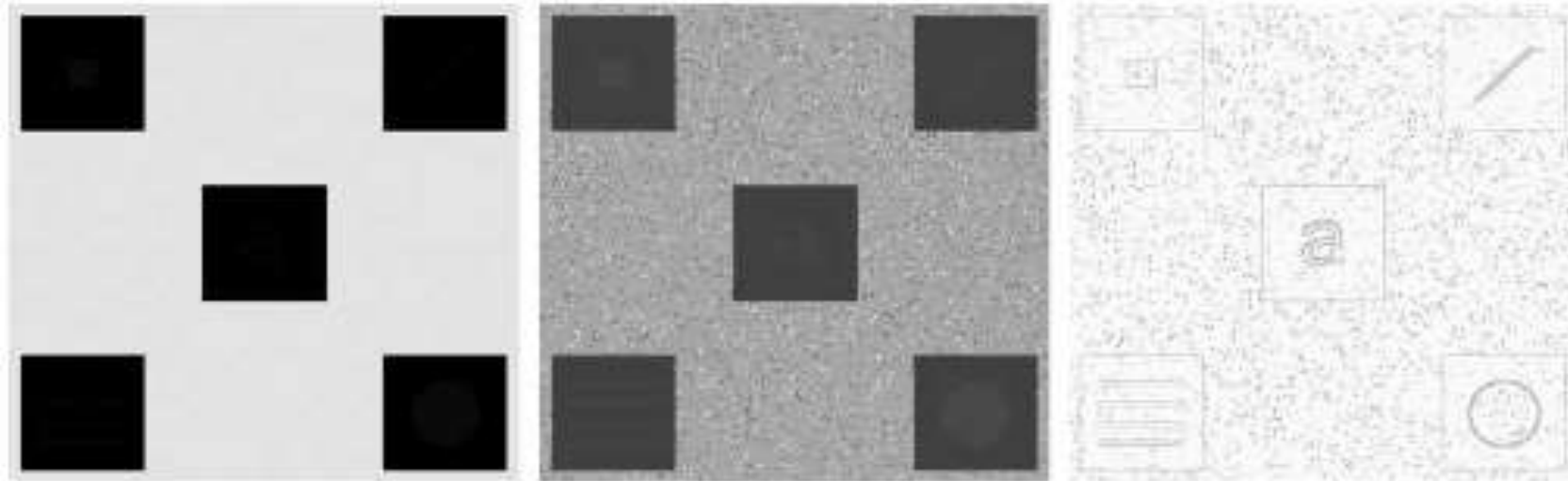


Local histogram processing

- The histogram processing methods discussed in the previous two sections are global, in the sense that pixels are modified by a transformation function based on the intensity distribution of an entire image
- Although this global approach is suitable for overall enhancement, there are cases in which it is necessary to enhance details over small areas in an image. The number of pixels in these areas may have negligible influence on the computation of a global transformation whose shape does not necessarily guarantee the desired local enhancement. The solution is to devise transformation functions based on the intensity distribution in a neighborhood of every pixel in the image

- The histogram processing techniques previously described are easily adapted to local enhancement. The procedure is to define a neighborhood and move its center from pixel to pixel.
- At each location, the histogram of the points in the neighborhood is computed and either a histogram equalization or histogram specification transformation function is obtained. This function is then used to map the intensity of the pixel centered in the neighborhood.
- The center of the neighborhood region is then moved to an adjacent pixel location and the procedure is repeated. Because only one row or column of the neighborhood changes during a pixel-to-pixel translation of the neighborhood, updating the histogram obtained in the previous location with the new data introduced at each motion step is possible.
- This approach has obvious advantages over repeatedly computing the histogram of all pixels in the neighborhood region each time the region is moved one pixel location. Another approach used sometimes to reduce computation is to utilize nonoverlapping regions, but this method usually produces an undesirable “blocky” effect.

Histogram statistics for image enhancement



a b c

FIGURE 3.26 (a) Original image. (b) Result of global histogram equalization. (c) Result of local histogram equalization applied to (a), using a neighborhood of size 3×3 .



The mechanics of linear spatial filtering using a neighborhood. At any point (x, y) in the image, the response, g , of the filter is the sum of products of the filter coefficients and the image pixels encompassed by the filter

$$g(x, y) = w(-1, -1)f(x - 1, y - 1) + w(-1, 0)f(x - 1, y) + \dots \\ + w(0, 0)f(x, y) + \dots + w(1, 1)f(x + 1, y + 1)$$

In general, linear spatial filtering of an image of size with a filter of size is given by the expression: where x and y are varied so that each pixel in visits every pixel in f.w

$$g(x, y) = \sum_{s=-a}^a \sum_{t=-b}^b w(s, t)f(x + s, y + t)$$



Any Query????

Thank you.....