EIE4512 - Digital Image Processing

Totorial

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Agenda

Harris corner detector

HM1:Filtered Noise

HM1:Filtering in the two Domains

HM1:Histogram Equalization

Harris corner detector

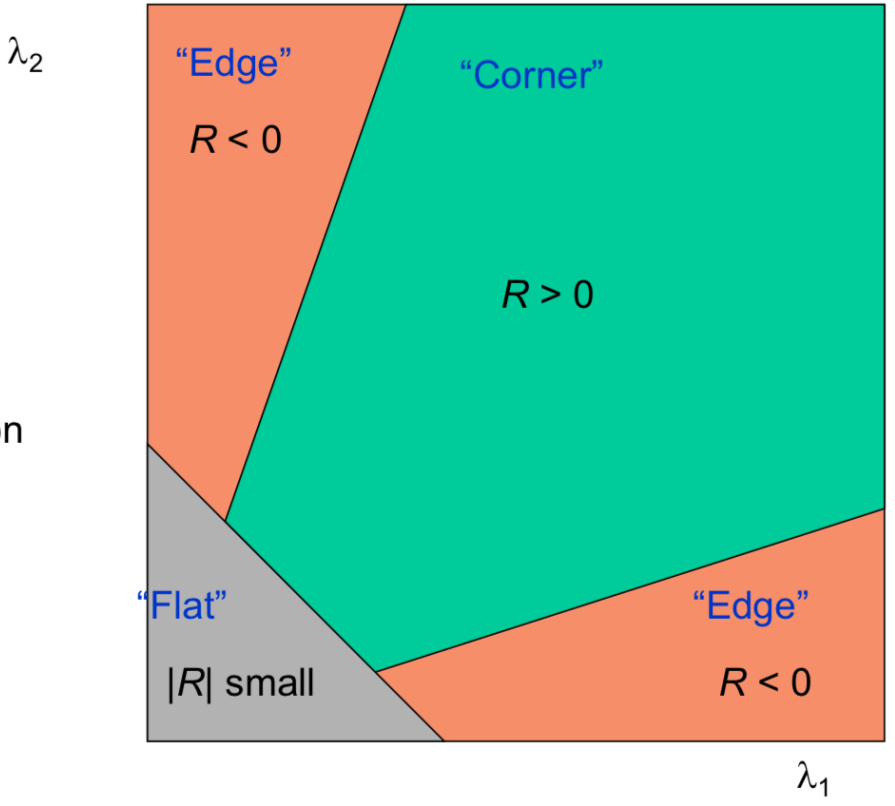
- Theory

• R depends only on eigenvalues of M

• R is large for a corner

• R is negative with large magnitude for an edge

• $|R|$ is small for a flat region



- Work flow
  - Find points with large corner response function R (R ¿ threshold)
  - Take the points of local maximum of R

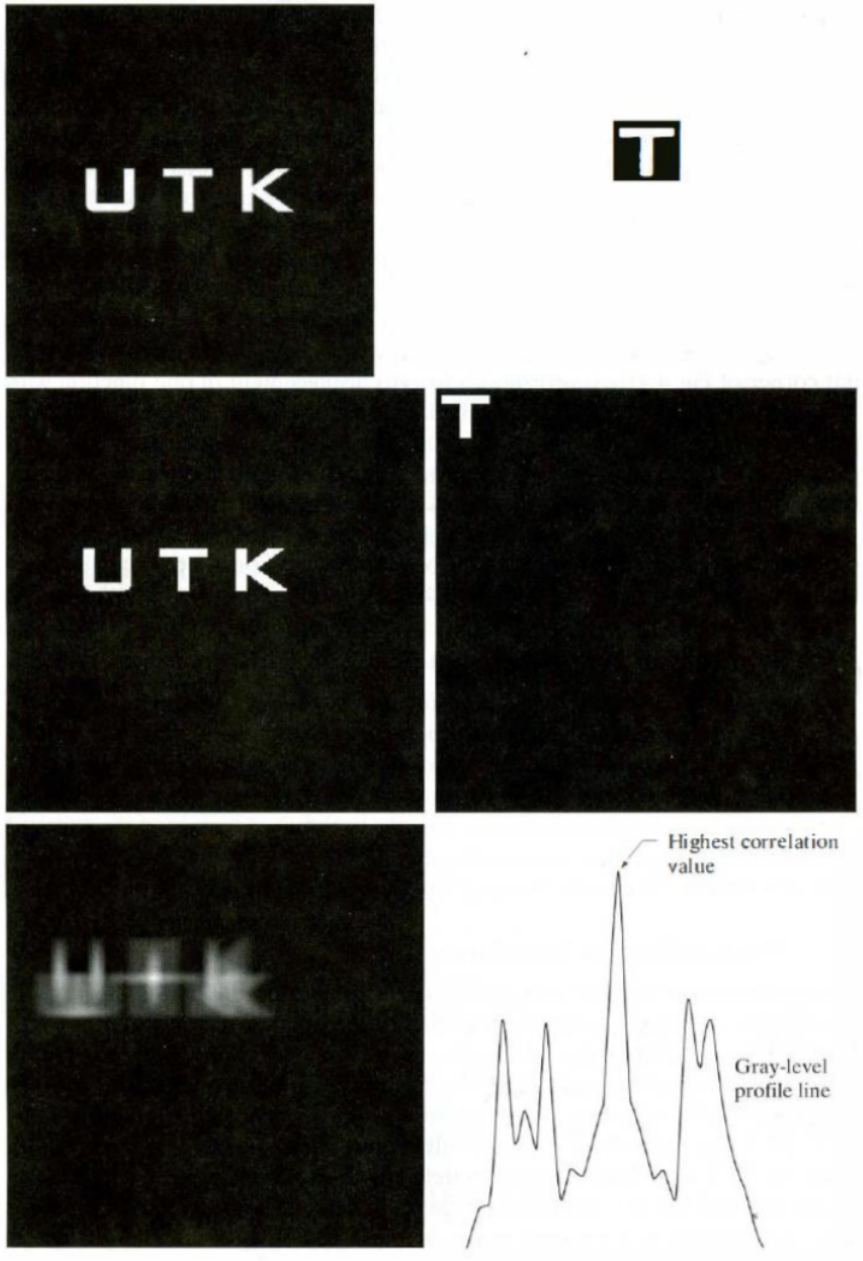
HM1:Filtered Noise

Consider the filter with Fourier transform

$$H(u,v) = \frac{1}{u^2 + v^2}$$

on the interval $[-127,128]\times[-127,128]$. This is known as a $1/f^2$ transfer function. Since it blows up at the origin, replace that value with zero. Apply this filter to a 256×256 image of normally distributed random noise (use **randn**). For practical reasons, it is best to perform this operation in the frequency domain. Hint: you will need to use **meshgrid**, **fft2**, **ifft2**, and **fftshift**. Also, due to numerical error, you will need to use real to look at the real part of the filtered image in the spatial domain.

HM1:Filtering in the two Domains



a b
c d
e f

FIGURE 4.41
(a) Image.
(b) Template.
(c) and
(d) Padded images.
(e) Correlation function displayed as an image.
(f) Horizontal profile line through the highest value in (e), showing the point at which the best match took place.

HM1:Histogram Equalization

raw

equalized

(a) Write an m-file to show picture histogram. Hint: use **imhist**

(b) Do histogram equalization on the input image, and compare the histogram difference between input image and output image. Hint: use **histeq**