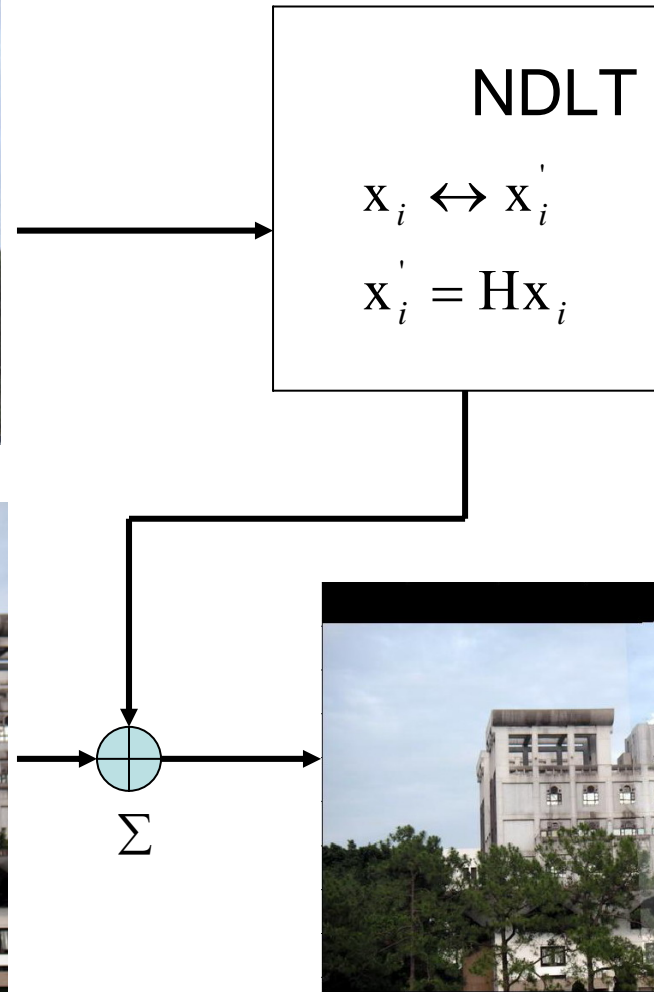
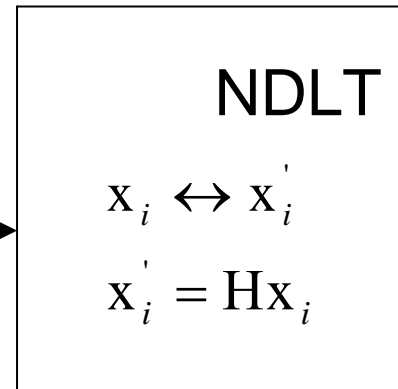
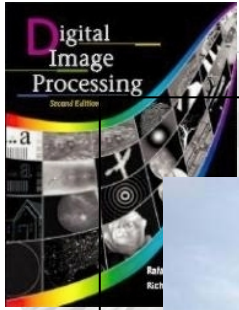


HW#3 2D Transformation





$[X]$
→

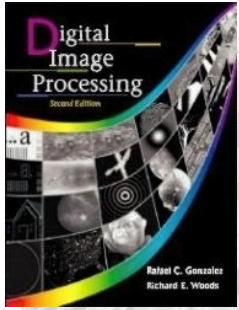
Correspondence

$$x_i \leftrightarrow x'_i \quad i = 1, 2, \dots, n; n \geq 4$$

$$[X] = [x_1 \quad x_2 \quad \dots \quad x_n]$$

$$[X'] = [x'_1 \quad x'_2 \quad \dots \quad x'_n]$$

→
 $[X']$



$$[X]$$


Normalization of x

Find matrix T let $\tilde{x}_i = T x_i$

Condition of T

- (i) The points are translated so that their centroid is at the origin.
- (ii) The points are then scaled so that the average distance from the origin is equal $\sqrt{2}$

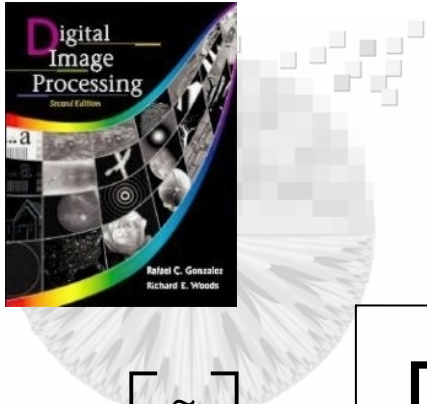
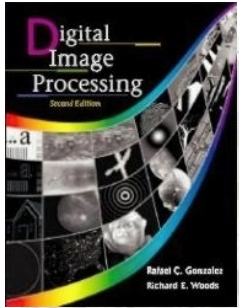
$$\begin{bmatrix} \tilde{x} \\ X \end{bmatrix}$$


$$[X']$$


Normalization of x'

$\tilde{x}'_i = T' x'_i$

$$\begin{bmatrix} \tilde{x}' \\ X' \end{bmatrix}$$

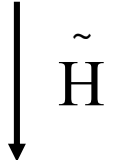



$$\begin{bmatrix} \tilde{x} \\ \mathbf{X} \end{bmatrix}$$



DLT
 $\tilde{x}'_i = \tilde{H} \tilde{x}_i$
 Solving of \tilde{H}
 (DLT.m)
 $(\tilde{H} = DLT(\tilde{x}', \tilde{x}))$

$$\begin{bmatrix} \tilde{x}' \\ \mathbf{X} \end{bmatrix}$$



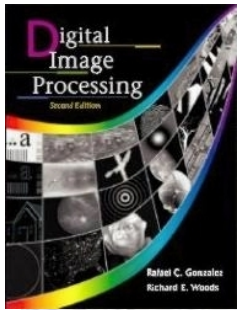
Denormalization
 Set $H = T'^{-1} \tilde{H} T$



$$\begin{bmatrix} \mathbf{x}' & : & H\mathbf{x} \end{bmatrix}$$



H



Homography

- 繳交作業需包含報告(課堂上繳交)及程式(upload)
 - 報告內容至少要有前言、研究方法、結果、結論或討論。
 - 程式上傳前請確定能 run ，並附上說明。
- 使用語言：Matlab
- 繳交方式:FTP上傳至140.114.27.115 ID:94IP PASSWD:lab708
 - 建立自己的學號目錄:例/u93XXXX/.../HW3/version X/
X=1,2,3...
- 評分標準
 - 將圖二完成transformation並與圖一結合(60%)
 - 報告(40%)
 - 加分題:
- 繳交期限:
- 切勿抄襲



圖一



圖二