



$$(x_i, y_i) \rightarrow (x'_i, y'_i) \quad i = 1, \dots, n$$

$$n = 4$$

$$x_i = a_{11}x'_i + a_{12}y'_i + a_{13}$$

$$y_i = a_{21}x'_i + a_{22}y'_i + a_{23}$$

$$\begin{bmatrix} x'_i & y'_i & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & x_i & y_i & 1 \end{bmatrix} \begin{bmatrix} a_{11} \\ a_{12} \\ a_{13} \\ a_{21} \\ a_{22} \\ a_{23} \end{bmatrix} = \begin{bmatrix} +x_i \\ +y_i \end{bmatrix}$$

\nwarrow b_i
 \nwarrow a

$$X_i a = b_i$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} a = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix}$$

$$X a = b \Rightarrow$$

$$a = [X X^T]^{-1} X^T b$$