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Makeup

4-14-19

1. Cross Ration: $Cr(p_1, p_2, p_3, p_4) = \frac{\Delta_{13}\Delta_{24}}{\Delta_{14}\Delta_{23}}$

$p_i = [X_i, Y_i, W_i]^T$ & $p_j = [X_j, Y_j, W_j]^T$

$$\Delta_{ij} = \sqrt{\left(\frac{X_i}{W_i} - \frac{X_j}{W_j}\right)^2 + \left(\frac{Y_i}{W_i} - \frac{Y_j}{W_j}\right)^2}$$

$\Delta_{23} = \Delta_{24} = \infty$ when $W = 0$

↳ $Cr(p_1, p_2, p_3, p_4) = \frac{\Delta_{13}}{\Delta_{14}}$

2. $x' = \frac{(1+h_{00})x + h_{01}y + h_{02}}{h_{20}x + h_{21}y + 1}$ & $y' = \frac{h_{10}x + (1+h_{11})y + h_{12}}{h_{20}x + h_{21}y + 1}$

$$J = \frac{\partial f}{\partial p} = \frac{1}{D}\begin{bmatrix} x & y & 1 & 0 & 0 & 0 & -x'x & -x'y \\ 0 & 0 & 0 & x & y & 1 & -y'x & -y'y \end{bmatrix}$$

$$H = \begin{bmatrix} h_{00} & h_{01} & h_{02} \\ h_{10} & h_{11} & h_{12} \\ h_{20} & h_{21} & h_{22} \end{bmatrix}$$

3. $[\hat{e}_x] = [s_0 \; s_1 \; \hat{e}] \begin{bmatrix} 1 & & \\ & 1 & \\ & & 0 \end{bmatrix} \begin{bmatrix} 0 & -1 & \\ 1 & 0 & \\ & & 1 \end{bmatrix} \begin{bmatrix} s_0^T \\ s_1^T \\ \hat{e}^T \end{bmatrix}$

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4. Fundamental Matrix: Derive the relationship between two corresponding image pts from two different cameras when uncalibrated.

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