

Radial distortion can be represented as follows:

$$\begin{aligned}x_{distorted} &= x(1 + k_1r^2 + k_2r^4 + k_3r^6) \\ y_{distorted} &= y(1 + k_1r^2 + k_2r^4 + k_3r^6)\end{aligned}$$

Similarly, tangential distortion occurs because the image-taking lense is not aligned perfectly parallel to the imaging plane. So, some areas in the image may look nearer than expected. The amount of tangential distortion can be represented as below:

$$\begin{aligned}x_{distorted} &= x + [2p_1xy + p_2(r^2 + 2x^2)] \\ y_{distorted} &= y + [p_1(r^2 + 2y^2) + 2p_2xy]\end{aligned}$$

In short, we need to find five parameters, known as distortion coefficients given by:

$$Distortion\ coefficients = (k_1 \quad k_2 \quad p_1 \quad p_2 \quad k_3)$$