

Figure 3: Intrinsic Parameters

Intrinsic Parameters

The intrinsic parameters include the focal length, the optical center, also known as the principal point, and the skew coefficient.

The camera intrinsic matrix, K , is defined as:

$$\begin{bmatrix} f_x & 0 & 0 \\ s & f_y & 0 \\ c_x & c_y & 1 \end{bmatrix}$$

In Lyft dataset, the camera_intrinsic matrix is transposed

element1	element2	element3
3409.1841121	0	1016.9321298
0	877.28532454	513.86599197
0	0	1

Lyft Intrinsic Parameters

(f_x, f_y) — Focal length in pixels.
 $f_x = F / p_x$
 $f_y = F / p_y$
 F — Focal length in world units, typically expressed in millimeters.
 (p_x, p_y) — Size of the pixel in world units.

- In the Lyft dataset, the focal length is the same in both the x and y directions.

These two are the Focal Length

element1	element2	element3
3409.1841121	0	1016.9321298
0	3409.1841121	513.86599197
0	0	1

Lyft Intrinsic Parameters

$[c_x \ c_y]$ — Optical center (the principal point), in pixels.

- Optical center does vary based on individual camera calibration.

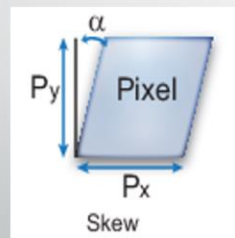
These two are the Optical Center

element1	element2	element3
3409.1841121	0	1016.9321298
0	3409.1841121	513.86599197
0	0	1

Lyft Intrinsic Parameters

s — Skew coefficient, which is non-zero if the image axes are not perpendicular.
 $s = f_x \tan \alpha$

The pixel skew is defined as:



- All pixel skew values are zero, meaning all images are perpendicular.
 - Important because the above means there is no reported distortion in population images.