tut3

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either one works

【round(t) - 4, round(t) + 4】, smaller but not bigger.
smaller: corner, there are no enough points

n is degree of freedom, line is 1
ransac: randomly choose n + 1, points to uniquely define a n-degree polynomial
2 count the number of points whose perpendicular distance to the line is < threshold(1? feeling?)
3 if count/total > fraction of inliners, p: (0.9? but sometimes, like shape x, it will never reach 0.9)
    return fit or return inliners
else: try another n + 1

performance on test it means how good it solving the problem itself:
not faster!!!
ransac perfom better, robust to outlier.
PCA doesn't handle outliers itself.

second part: apply ransac

CAMERA!!!!!!!!
thin-lens law
$\frac{1}{u}+\frac{1}{d}=\frac{1}{f}$
d: 物距

u：相距

f：焦距

signal to noise:

$\mathrm{SNR}(I,p) = 10 \log_{10} \frac{\mathrm{mean}(I(p)^2)}{\mathrm{var}(I(p))}$

for pixel in image I

double the aperture,

$\#\mathrm{photons} = k * \mathrm{intensity}$

πr^2 photons, from a circles

$4\pi r^2$ photons, from the second circle

$\therefore I_2 = 4I_1$, becuase of the linear response func

$\frac{\mathrm{SNR}(I_2, p)}{\mathrm{SNR}(I, p)}$

1 proton noise is proportional to the number of protons

2 readout noise is independent to the number of protons

Photon: Poisson distribution with mean = variance = number of incident photons

readout: normal distribution with var(I_2) = var(I)

$\mathrm{SNR}(I_2, p) = \frac{\mathrm{mean}^2}{\mathrm{var}} = \frac{\hat{I}^2}{\sigma}$

$\mathrm{SNR}(I_2, p) = \frac{\mathrm{mean}^2}{\mathrm{var}} = \frac{16\hat{I}^2}{\sigma}$

i hat t: the true intensity