

Jamin Early 99133391 - Quiz 1

Question 1

- Convert from .png to .jpg
- Ran calib_gui
- Select standard
- Select image names, imported all the images
- Extracted grid corners for each image (using 100x100mm dx and dx)
- Custom selected each # of squared depending on how many are in frame

Initial calibration results

Focal Length: $fc = [894.89574 \ 893.10387] \pm [8.08907 \ 7.83109]$

Principal point: $cc = [506.90994 \ 408.98646] \pm [5.04773 \ 5.03335]$

Skew: $\alpha_c = [0.00000] \pm [0.00000] \Rightarrow$ angle of pixel axes = 90.00000 ± 0.00000 degrees

Distortion: $k_c = [-0.17741 \ 0.17587 \ 0.00018 \ 0.00133 \ 0.00000] \pm [0.01267 \ 0.02841 \ 0.00133 \ 0.00139 \ 0.00000]$

Pixel error: $err = [1.56533 \ 1.44135]$

- We can further improve it by recomputing the corners. I will only do this once to avoid overfitting the dataset. These are the new values for our calibration:

Calibration results after optimization (with uncertainties):

Focal Length: $fc = [887.31029 \ 885.75150] \pm [2.58965 \ 2.51089]$

Principal point: $cc = [512.43669 \ 420.46790] \pm [1.64983 \ 1.62585]$

Skew: $\alpha_c = [0.00000] \pm [0.00000] \Rightarrow$ angle of pixel axes = 90.00000 ± 0.00000 degrees

Distortion: $k_c = [-0.19985 \ 0.14202 \ 0.00073 \ 0.00046 \ 0.00000] \pm [0.00374 \ 0.00757 \ 0.00038 \ 0.00039 \ 0.00000]$

Pixel error: $err = [0.41707 \ 0.55025]$

- Please note that I am NOT happy with these results. It appears that human error caused my pixel error to be too large. If this was not time sensitive, I would recalibrate the values.

Question 2

```
clc;  
clear;
```

```
px = 512.43669;  
py = 420.46790;
```

```
fx = 887.31029;  
fy = 885.75150;  
K = [fx,0,px;  
     0,fy,py;  
     0,0,1];  
X_cam = [18;-30;60;1];  
IM = eye(3,4);  
x = K*IM*X_cam;  
u = x(1)/x(3)  
v = x(2)/x(3)
```

u =

778.6298

v =

-22.4078