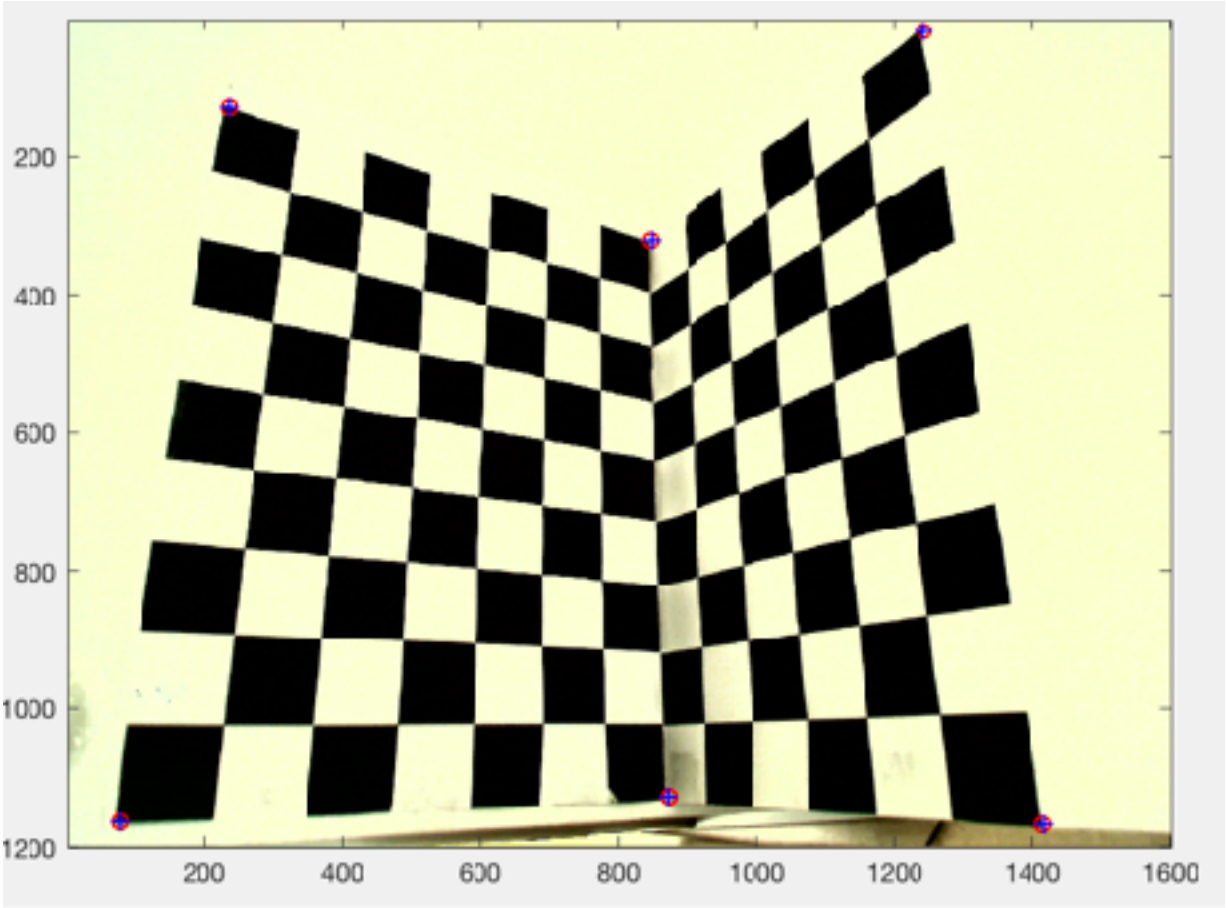
Computer Vision
Exercise 1
Report
Tianqi Wang

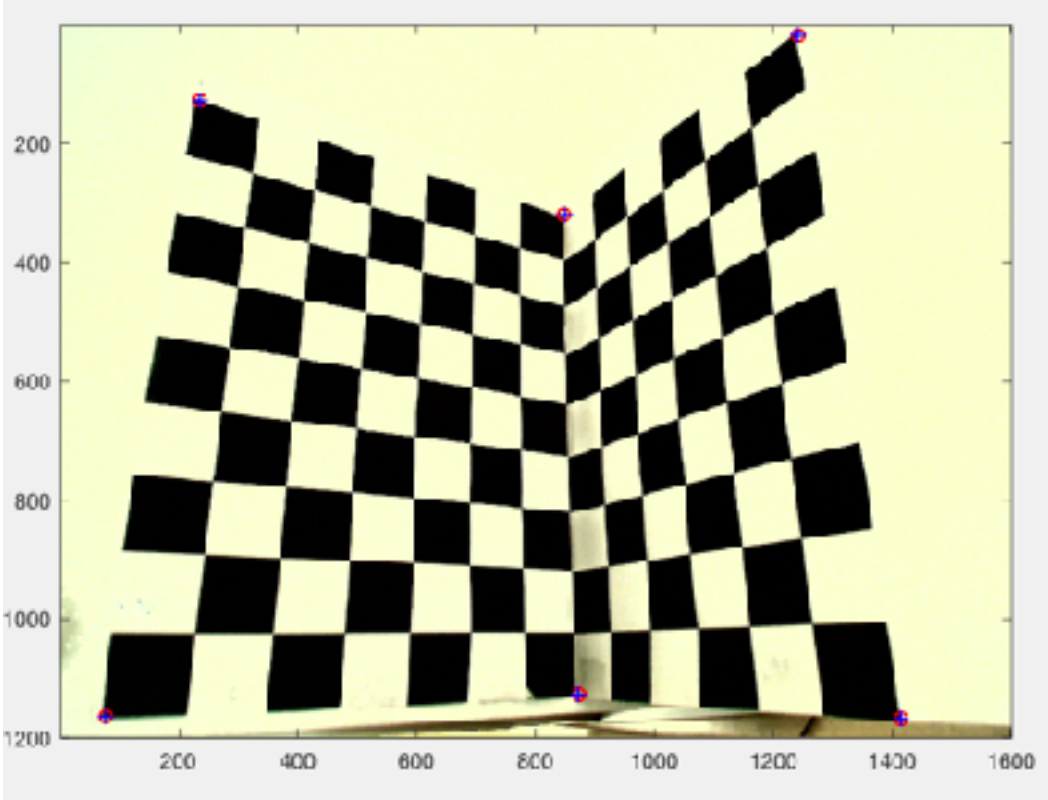
1. DLT

Error: 0.9731



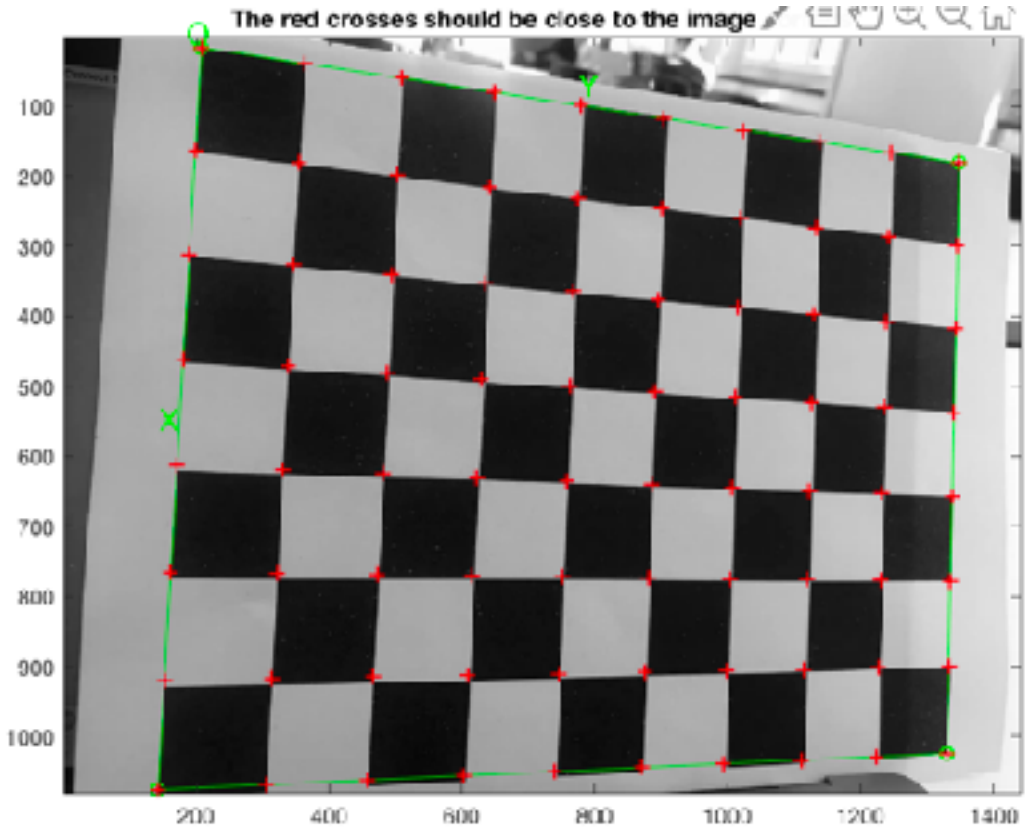
2. Gold Standard

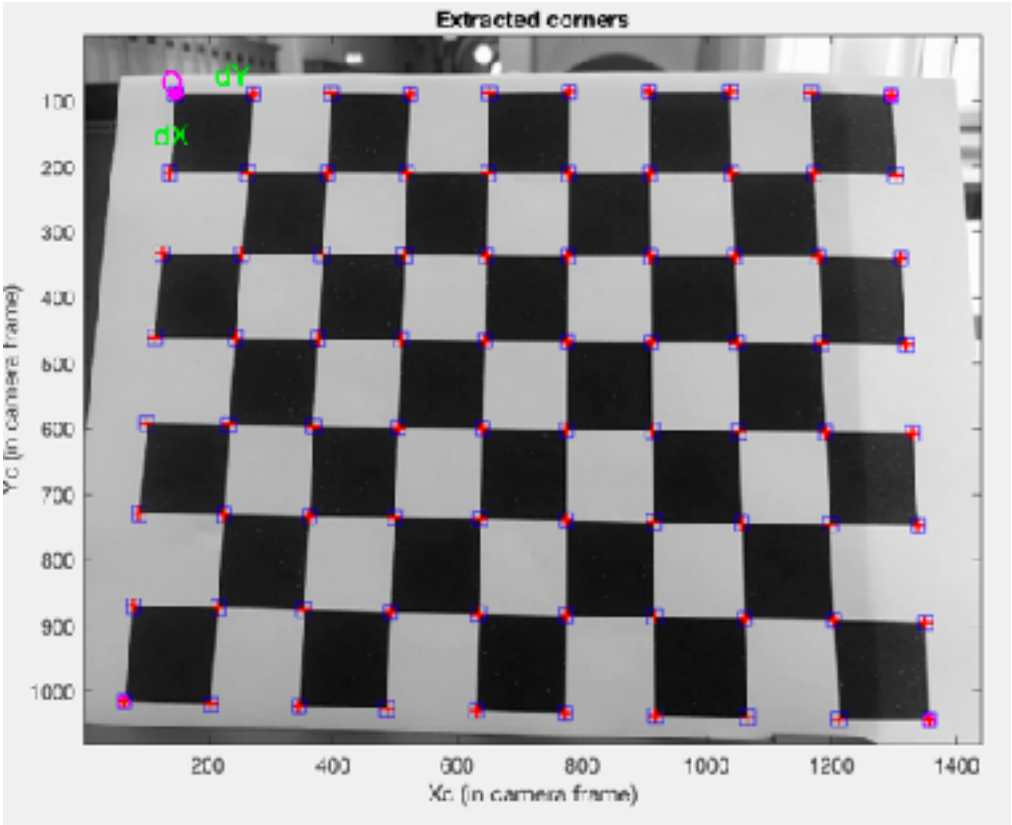
Error: 0.8174
It has lower error than DLT method, probably because of the iterative steps to minimise the cost function.



3. Bouget's Calibration Toolbox

I took 6 pictures with the checkerboard in total. Some of the examples of the reprojected points are shown below:





The parameters are shown below:

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Calibration results after optimization (with uncertainties):

Focal Length:          fc = [ 1156.36164   1158.87206 ] +/- [ 23.81368   23.35919 ]
Principal point:       cc = [ 781.69327   533.67546 ] +/- [ 5.38499   6.92638 ]
Skew:             alpha_c = [ 0.00000 ] +/- [ 0.00000  ]   => angle of pixel axes = 90.00000 +/- 0.00000 degrees
Distortion:            kc = [ 0.21847   -0.84589   -0.00225   -0.00089  0.00000 ] +/- [ 0.00940   0.01598   0.00100
Pixel error:          err = [ 0.90443   1.01559 ]
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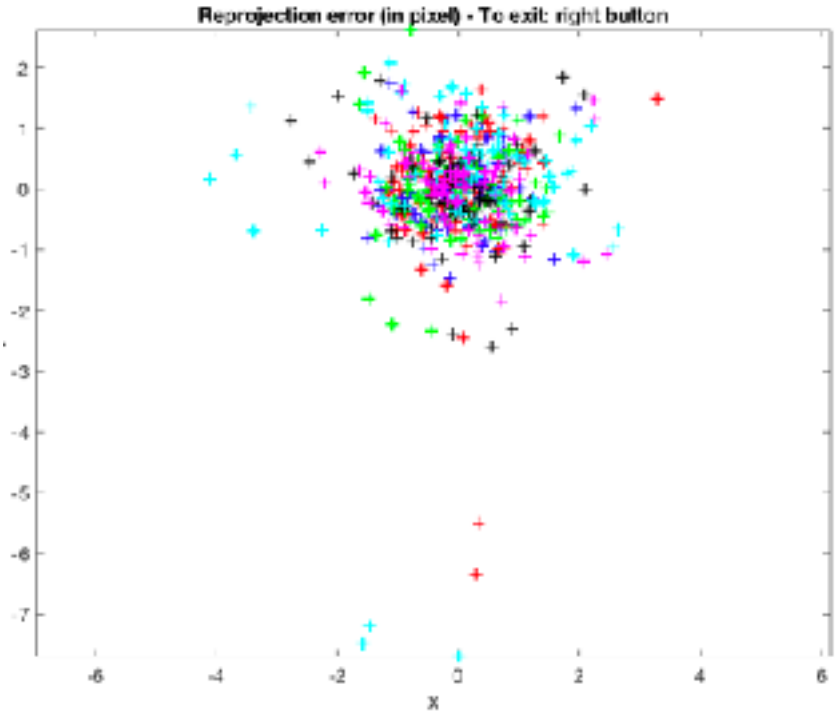
We can see that the pixel error is around [0.9, 1].

We could also visualise the reprojected error, as shown below:



We could see the visualisation of extrinsic parameters as below: