Assignment4 Report

Hongchao Fang

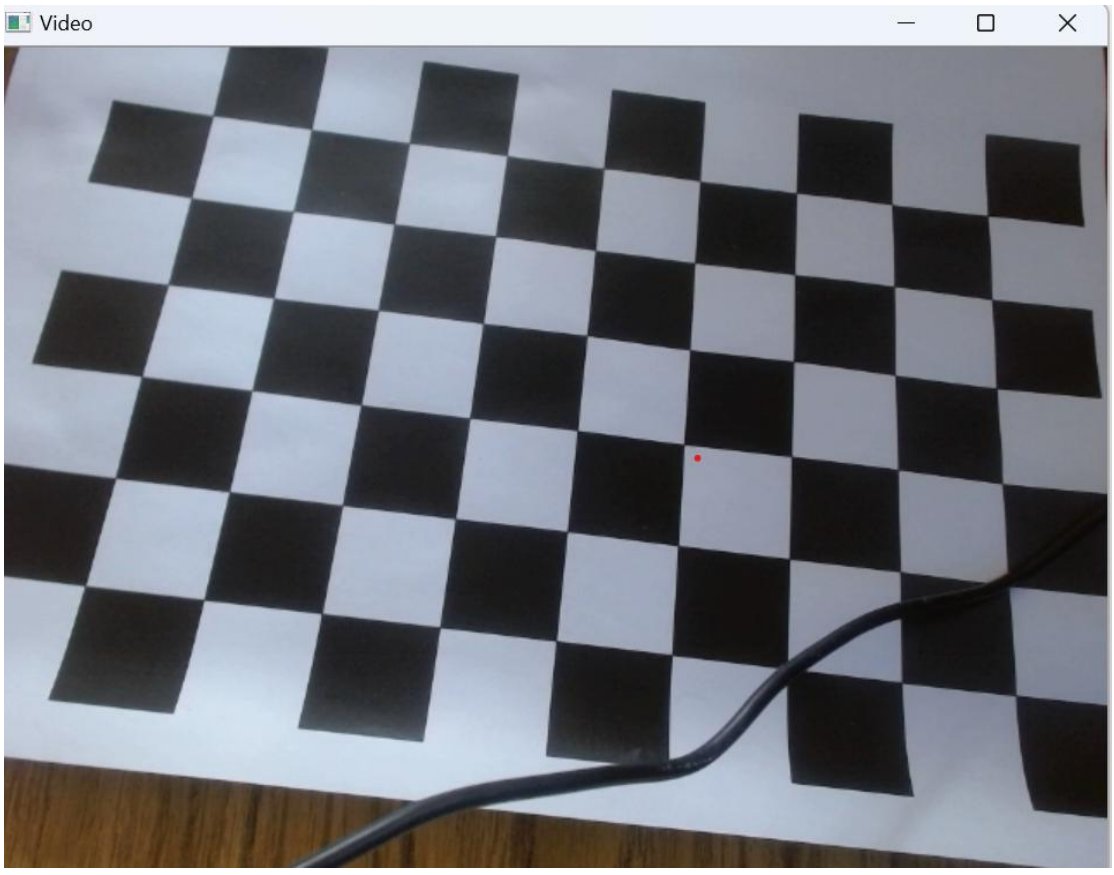
Introduction

In this assignment, we need to calibrate a camera and then use the calibration to generate virtual objects in a scene. Based on the chessboard, the program construct a virtual pyramid in 3D world space made out of lines.

Steps

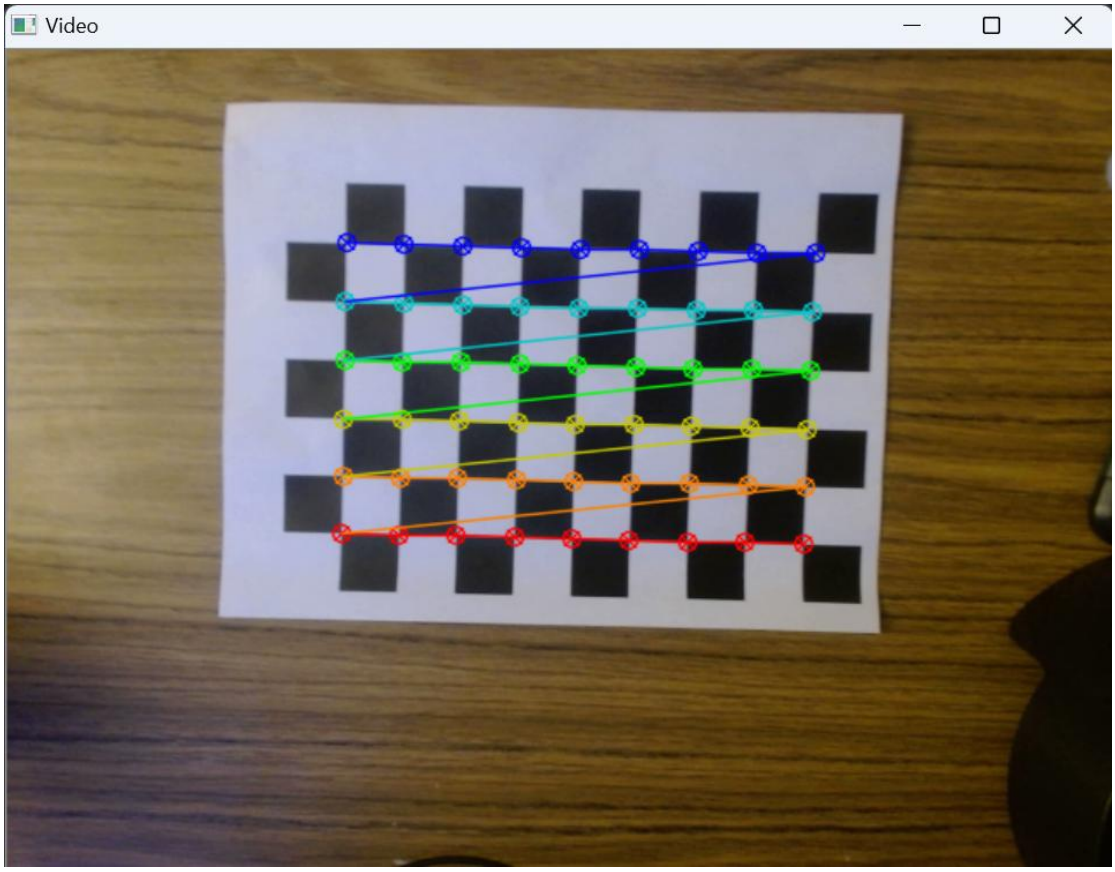
Detect and Extract Chessboard Corners

Chessboard



Select Calibration Images

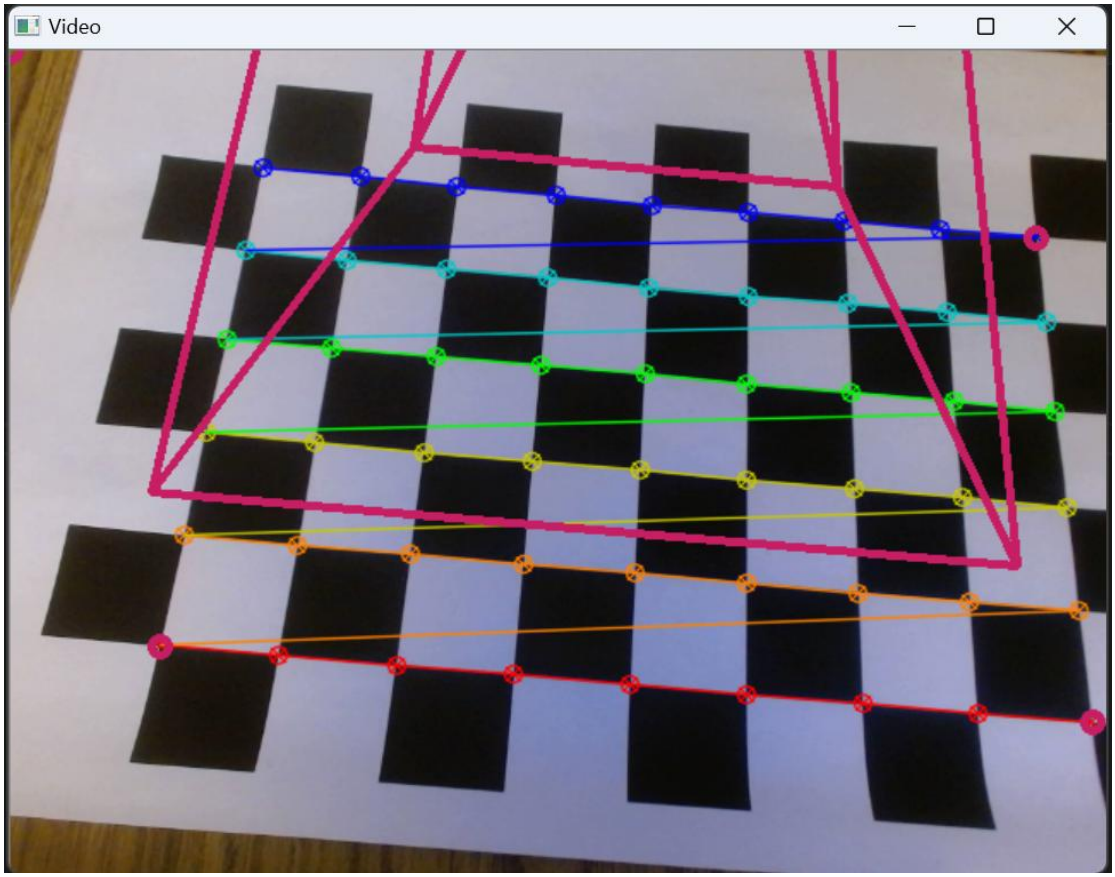
The next step is to let the user specify that a particular image should be used for the calibration and save the corner locations and the corresponding 3D world points.



Error estimate

```
point_size 54    corner_size 54
distCoeff:0.024791 -0.034669 0.000495 0.001605 -0.163683
matrix:639.157521 0.000000 321.116849 0.000000 639.131796 251.813605 0.000000 0.000000 1.000000
erorr:0.422261
```

Project Outside Corners or 3D Axes



Video

https://drive.google.com/file/d/1k_JXMa-llMpT5uJEK_IYA-NWn-2PwGNE/view?usp=sharing

Conclusion

In this assignment, I practiced my skill with camera calibration and construct 3D images on video .In the end, I also get familiar with many basic libs of opencv.

Acknowledgement

1. Gonzalez, Rafael C.; Woods, Richard E. (2008). Digital Image Processing (3rd ed.). Prentice Hall. p. 128. ISBN 9780131687288 .

2. ^ Gonzalez, R.C.; Fittes, B.A. (June 9– 11, 1975). Gray-level transformations for interactive image enhancement (PDF). 2nd Conference on Remotely Manned Systems: Technology and Applications. Los Angeles, California. pp. 17– 19.

3. ^ Coltuc, Dinu; Bolon, Philippe; Chassery, Jean-Marc (May 2006). "Exact Histogram Specification". IEEE Transactions on Image Processing. 15 (5): 1143–52.Bibcode:2006ITIP...15.1143C. doi:10.1109/TIP.2005.864170. PMID 166 71295. S2CID 16060881