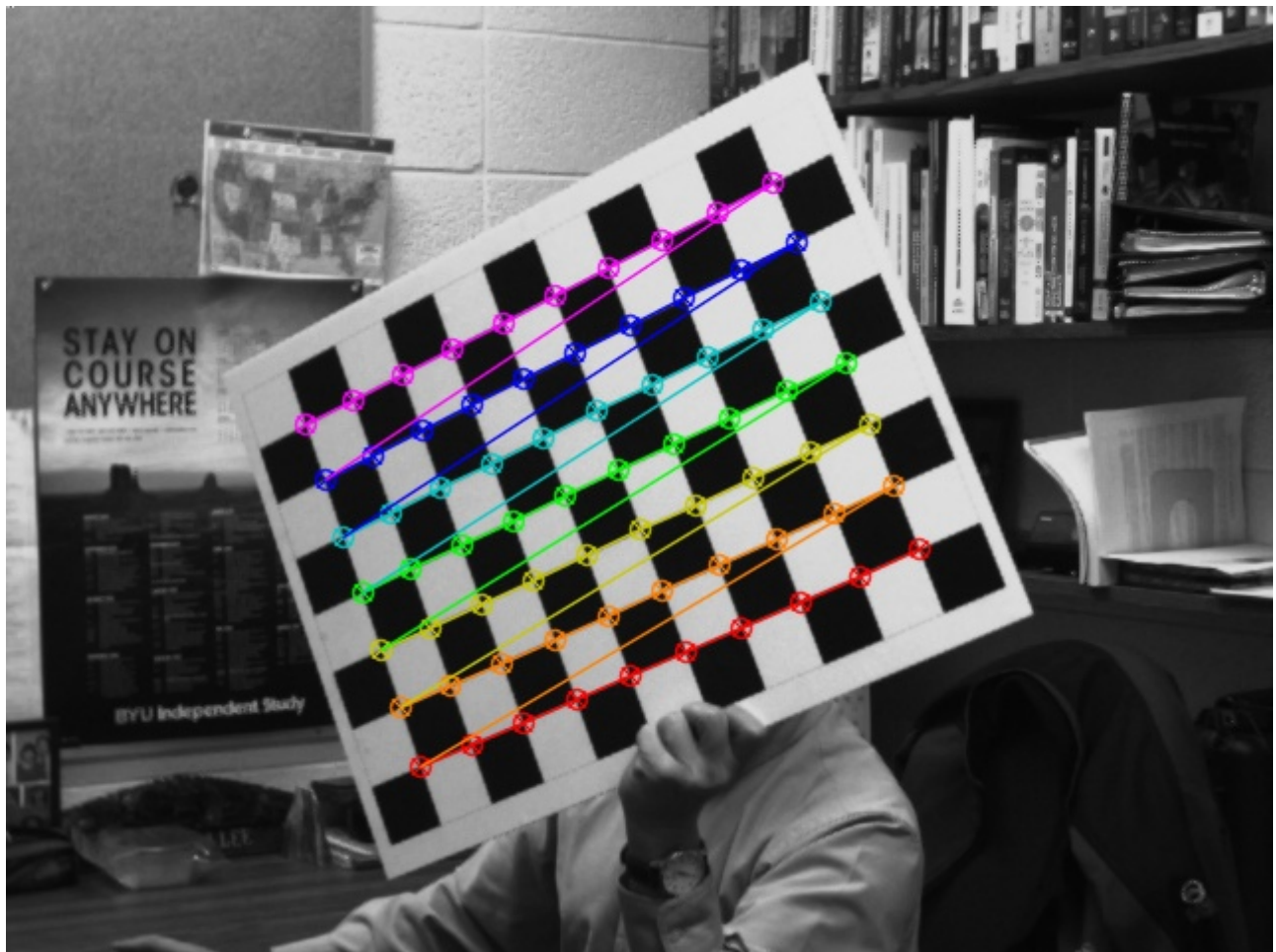# Camera Calibration & Distortion Correction

EcEn 631 - Assignment 2 - Luke Newmeyer

Task 1 - Corner Detection

The following is the result given from my code written for corner detection.

Corner Detection Output
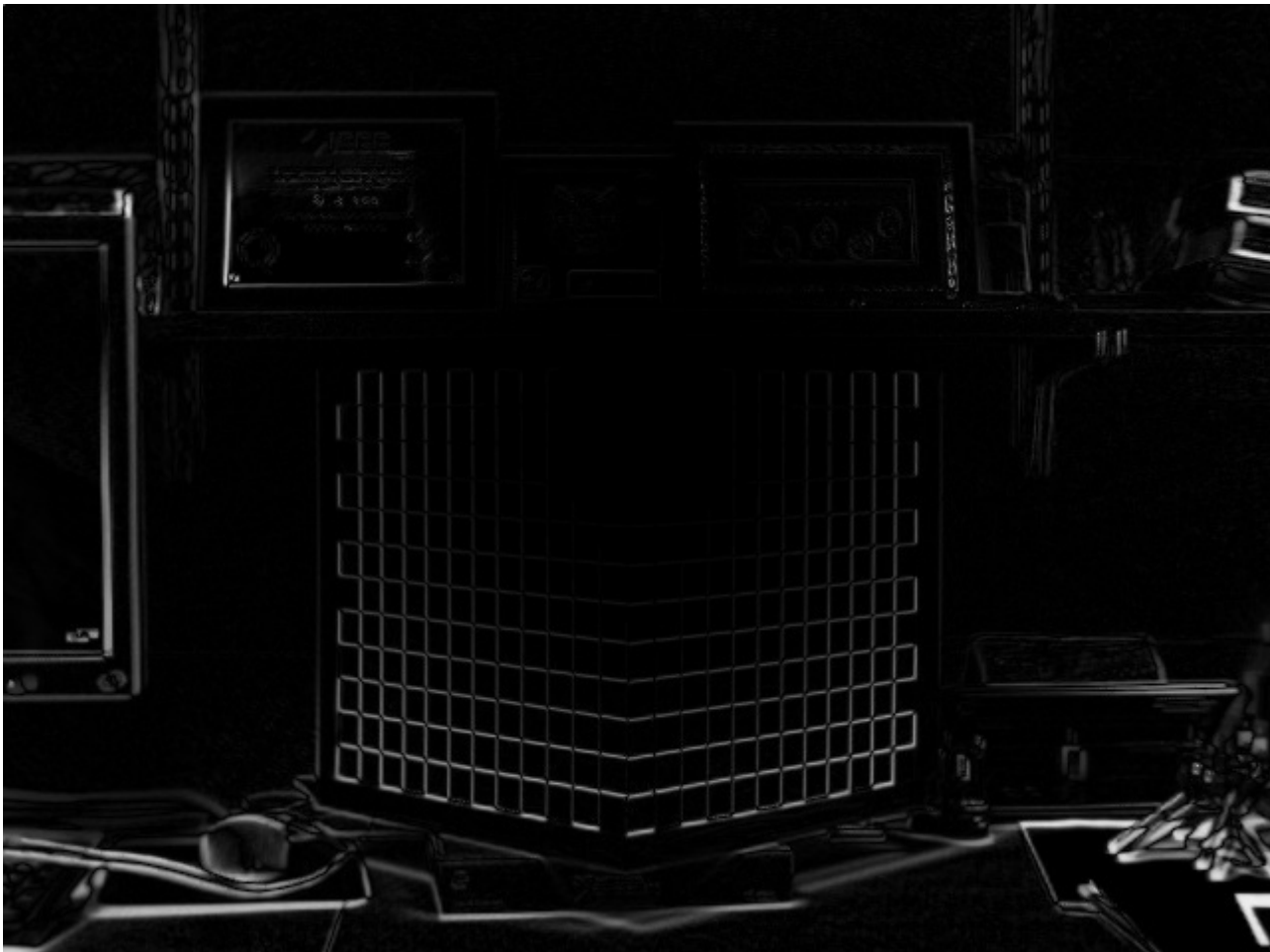

Task 2 - Intrinsic Parameters

The following are the intrinsic and distortion parameters computed from the images provided.

```
intrinsic_params =
    [1145.223455665104, 0, 328.945216696177;
     0, 1143.600007277263, 222.1597641571362;
     0, 0, 1]
distortion_params =
    [-0.2575507934862325;
     0.04884197280891184;
     -0.001409751152446753;
     -0.001543707631160005;
     0.9076529637760357]
```

Task 3 - Distortion Correction

The following images are distortion corrected from the intrinsic parameters computed in Task 2.

Distortion Correction Far

Distortion Correction Close

Distortion Correction Turn

Task 4 - Object Pose Estimation

The following are the rotation and translation matricies for the object data provided.

```
rotation =
    [0.7354706625150564, -0.6774298093547906, 0.01310564676756049;
     -0.003190169014756383, -0.02280449923942213, -0.9997348536667592;
     0.6775490590365552, 0.7352338459374481, -0.01893315575141785]
translation =
    [-0.02466089907017876;
     10.48750338023632;
     46.67923546700356]
```

Task 5 - Intrinsic Parameters (Camera)

The following are the intrinsic and distortion parameters using my personal webcam.

```
intrinsic_params =
    [957.6129263627653, 0, 409.749409549764;
     0, 953.5666607530868, 282.6446950085418;
     0, 0, 1]
distortion_params =
    [-0.1271090608365228;
     0.2924936363105562;
     0.0051567508076029;
     -0.05116578986005205;
     -1.617042692213017]
```

Task 6 - Distortion Correction (Camera)

The following is an image captured, corrected for distortion, and diffed against the original.

Distortion Correction Output