

# Lab report 8: 2023/05/23

- In this task, first I read all the images containing a chessboard pattern, in the provided path.
- Then using the `cv::findChessboardCorners()` function, I detected the chessboard intersections of each image and then `cv::cornerSubPix()` function to refine the detections and get the float value of the intersection location.
- After that I used `cv::calibrateCamera()` function with the result points in the previous step to calibrate the camera.
- Then I computed the reprojection error, camera matrix, distortion coefficients, and mean reprojection error of the camera. For calculating the mean reprojection error I used this algorithm: sum of (norm of image\_points and projected\_points) divided by the number of points.
- Finally, I used the parameters of the camera calculated in previous steps to undistort and rectify a new test image taken by the same camera, and showed both the original and result image in the same window.

```
Administrator: Windows Pow... X + -
Checkerboard pattern found in image: .\data\checkerboard_images\0042_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0043_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0044_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0045_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0046_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0047_color.png
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Checkerboard pattern found in image: .\data\checkerboard_images\0055_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0056_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0057_color.png
Checkerboard pattern found in image: .\data\checkerboard_images\0058_color.png
Checkerboard pattern found in 57 images out of 57
Colibrating camera...
Camera calibration successful!
Reprojection error: 0.725378
Camera matrix:
[1248.517652813431, 0, 974.6977769445633;
 0, 1247.398935323677, 683.2545864994242;
 0, 0, 1]
Distortion coefficients:
[-0.308545052473177, 0.1391326775329023, 2.471170133709115e-05, 0.0003227517571554567, -0.03628703450759051]
Mean reprojection error: 1.47022
```



Figure 1 - Original images vs Undistorted images