

Computer vision course

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Lab 8 - Camera calibration

Task 1

Get calibration images using a camera (e.g., your smartphone).

Calibration patterns are provided. You should count the number of square intersections per row and column and measure the size of the square side.

You should place the calibration pattern on a flat surface (e.g., your desk) and take several pictures with different orientations and distances. The pattern should appear in many different positions in the images.

Once you have acquired the pictures, you should move them to the computer where you are going to develop your code.

If you do not have a camera, you can download some pictures here:

<https://drive.google.com/file/d/1TFOZcr8P6g6vkRtrkwk5gcqol2FigSyy/view?usp=sharing>

(the squares in the checkerboard have 11cm size).

Task 2

Create a program that:

- loads the images;
- detects the checkerboard intersections per image - use the `cv::findChessboardCorners()` function. Optionally, you can use the `cv::cornerSubPix()` function to refine the detections;
- calibrates the camera using the points of the pattern - use the `cv::calibrateCamera()` function;
- computes the mean reprojection error - check how it is calculated and describe this in the report;
- undistorts and rectifies a new image acquired with the same camera - you can do that using the maps created by the `cv::initUndistortRectifyMap()` - check the documentation to understand how this map can be applied to the image;
- shows the distorted and undistorted images in the same window.