Gebze Technical University
Computer Vision
HW 03
Report

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Camera calibration is hard processing but OpenCV has some function to make it easy. I used OpenCV chessboard feature to calibrate my stereo cameras.

Finding chessboard and corners etc. is long process to do,then I write a function that use actually OpenCV findChessBoard function but also it should find chessboards at the same time on both camera.

For the purpose of calibrating stereo cameras, I write a class that takes camera indexes or directly cameras itself. Next, for calibrating process I defined windows and destroy when they will not use for calibration anymore.

I check the calibration and 3d reconstruction examples of OpenCV itself and they save the images that used when calibration. I saved too.

I write a function for finding chessboards at the same time on the both camera. I run it for 14 times. 14 is magical number here, OpenCV examples use it and I am using it then. The function check chess board at the same time and if both found draw chessboards corners on the images.

I use stereoCalibrate function to calibrate both camera as stereo system then I got camera matrixes, essential matrix, fundamental matrix etc. from the calibration process of OpenCV itself.

After calibrating the camera, I have not got camera projection matrixes from the stereo function but I will use rectification process for this purpose. I use rectification process of OpenCV but not actually I am rectifying images.

I define HandFinder for both camera and named window etc. Then I get both finger positions from cameras and I call the triangulation process of OpenCV itself again to calculate homogenous coordinates. I have wrote a function to make triangulation and transform from homogenous coordinates to real world coordinates.

I can draw Epipolar lines if the mode enabled. I also can calculate some finger distances but not all of them,If I can calculate I draw if drawing feature is enabled, and if printing on console feature is enabled I write the result of distance calculation on console.

I use disparity functions also but they are so slow,then I comment them out. At the demo I can show but it make program so slow.

references:

[1] http://docs.opencv.org/modules/calib3d/doc/camera_calibration_and_3d_reconstruction.html

[2] http://docs.opencv.org/trunk/doc/py_tutorials/py_calib3d/py_depthmap/py_depthmap.html

[3] http://airglow.csl.illinois.edu/~jessie/CV_project_FinalVersion.pdf

[4] http://www.morethantechnical.com/2012/01/04/simple-triangulation-with-opencv-from-harley-zisserman-w-code/