Introduction to Computer Vision
Camera Calibration

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ECE 631
Lab 6 Report

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1 Introduction

This lab deals with calibrating multiple cameras to track movement of objects. Here 6 cameras are calibrated to track a space of about 20x10 feet.

2 Calibration

Calibration was performed from 6 cameras. The tiles were placed such that they formed a 4x6 grid. The a-similar tile in the picture corresponds to the chosen origin. The picture depicting this is Fig 1

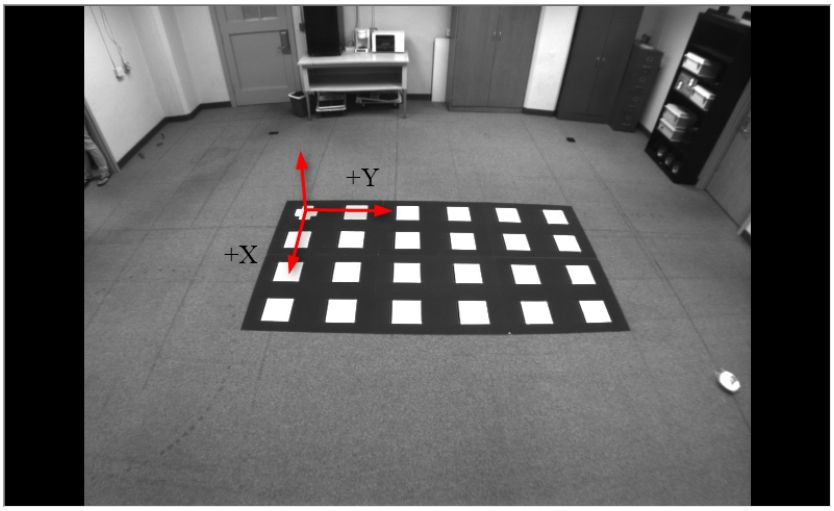

Figure 1: Calibration origin and axes as seen from cam 1

The figure also shows the axis of increasing X and Y used for calibration.

The result of the calibration for each camera considering the origin and axes as in Fig 1 are shown in the below figures

Camera	X Position (mm)	Y Position (mm)	Z Position (mm)
Cam 0	2236	4151	2229
Cam 1	2923	979	2277
Cam 2	3027	-2146	2320
Cam 3	-2289	-2011	2164
Cam 4	-2414	991	2162
Cam 5	-2447	4055	2200

Table 1: Calibration Camera Positions

The above table summarizes the positions of each camera with respect to the selected origin and axes.

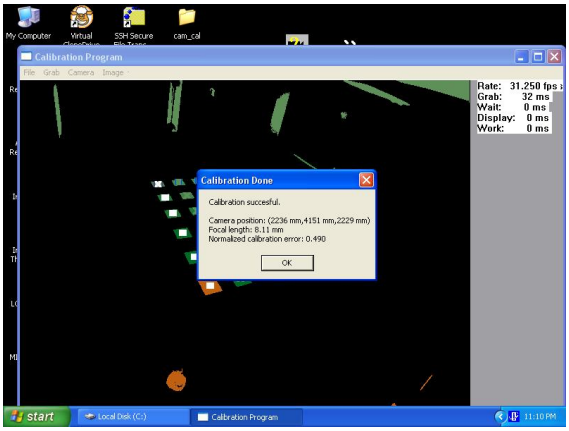

Figure 2: Camera 0 - Camera positions

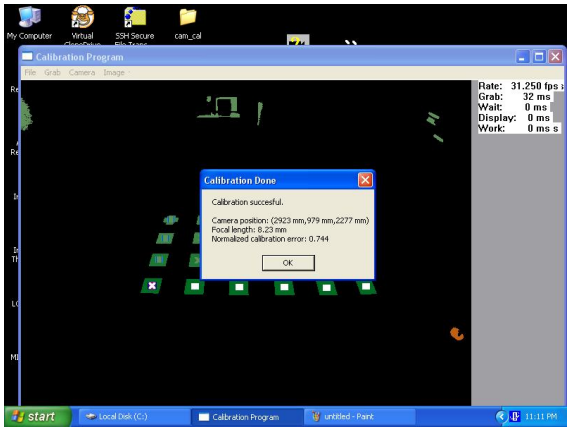

Figure 3: Camera 1 - Camera positions

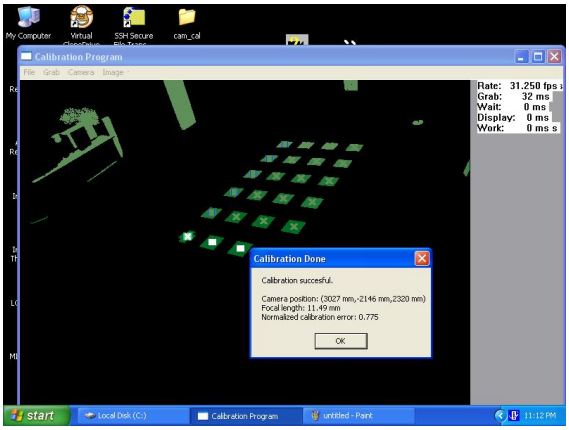

Figure 4: Camera 2 - Camera positions

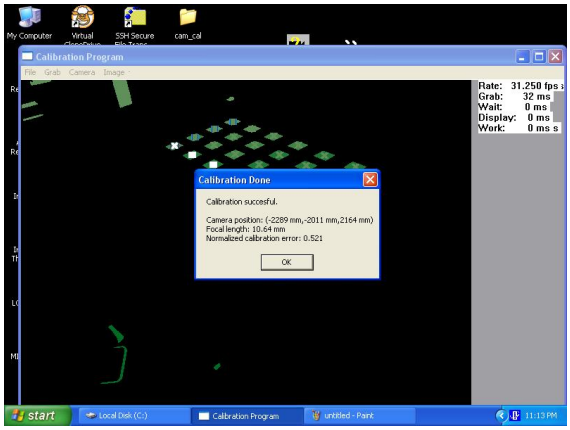

Figure 5: Camera 3 - Camera positions

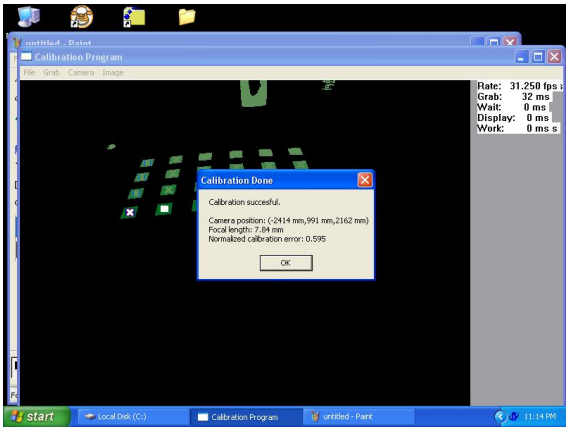

Figure 6: Camera 4 - Camera positions

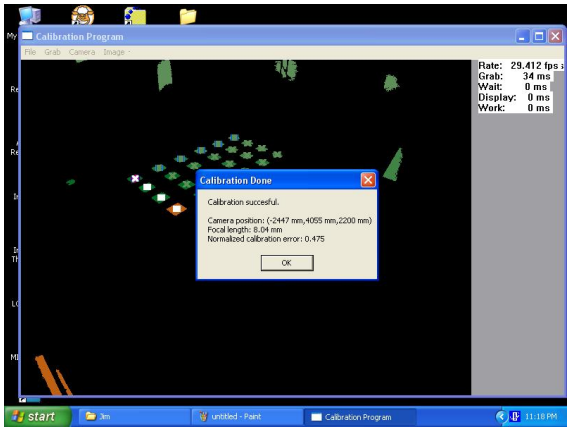

Figure 7: Camera 5 - Camera positions

3 Results

The tracking of movements of objects in the tracking space was achieved. The tracking space was designated by drawing polygons that encompass the area where tracking was expected. Fig 8 shows the presence of a chair in the tracking area. The boundaries of the tracking areas for each camera overlap as expected.

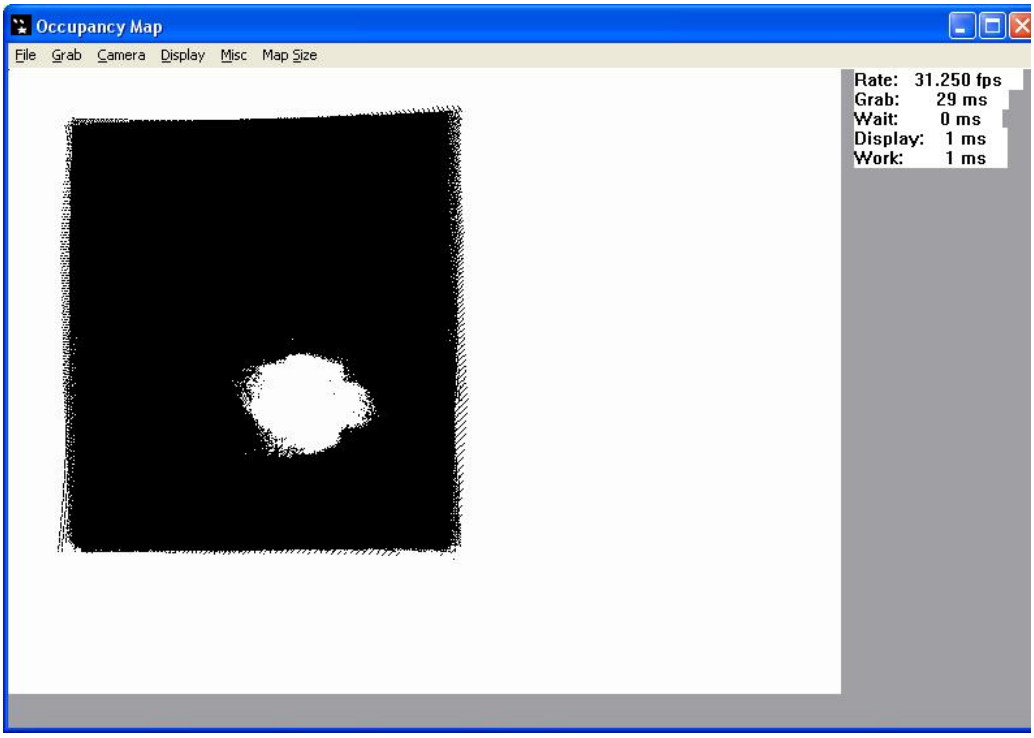

Figure 8: Tracking object presence in tracking area