Volume XXXVIII-3/W22

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXVIII-3/W22, 173-178, 2011
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXVIII-3-W22/173/2011/
doi:10.5194/isprsarchives-XXXVIII-3-W22-173-2011

CALIBRATION EVALUATION AND CALIBRATION STABILITY MONITORING OF FRINGE PROJECTION BASED 3D SCANNERS

C. Bräuer-Burchardt, A. Breitbarth, C. Munkelt, M. Heinze, P. Kühmstedt, and G. Notni
Fraunhofer IOF Jena, Albert-Einstein-Str. 7, 07745 Jena, Germany

Keywords: Fringe Projection, Calibration Evaluation, Epipolar Geometry, Optical 3D Measurement

Abstract. In this work a simple new method for calibration evaluation and calibration stability monitoring of fringe projection based 3D scanners is introduced. This method is based on high precision point correspondence finding of fringe projection sensors using phase values in two perpendicular directions and epipolar geometry concerning calibration data of stereo sensors. The calibration evaluation method can be applied in the measurement process and does not require any additional effort or equipment. It allows the evaluation of the current set of calibration parameters and consideration of the stability of the current calibration over certain temporal progression. Additionally, the quality of distortion correction can be scored. The behavior of three fringe projection based 3D stereo scanner types was analyzed by experimental measurements. Results of the different types of scanners show that calibration may be stable over a long time period. On the other hand, suddenly occurring disturbances may be detected well. Additionally, the calibration error usually shows a significant drift in the warm-up phase until the operating temperature is achieved.

Conference Paper (PDF, 680 KB)

Citation: Bräuer-Burchardt, C., Breitbarth, A., Munkelt, C., Heinze, M., Kühmstedt, P., and Notni, G.: CALIBRATION EVALUATION AND CALIBRATION STABILITY MONITORING OF FRINGE PROJECTION BASED 3D SCANNERS, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXVIII-3/W22, 173-178, doi:10.5194/isprsarchives-XXXVIII-3-W22-173-2011, 2011.

Bibtex EndNote Reference Manager XML