

Easy Calibration Technique for Stereo Vision Using a Circle Grid

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Abstract

Combined with the DIC (digital image correlation), the stereo vision calibrated by a circle grid can be used to measure the surface deformation of a deformable body. In the paper the grid dot centers are taken as the calibration points. A subpixel localization technique was developed to precisely find the location of the edge points of a dot and a conical section was then fitted to the obtained edge points to locate the dot center so that the intrinsic and extrinsic camera parameters can be accurately extracted after the camera calibration. The baseline measurement error of the stereo vision was evaluated by performing rigid body translation tests. By using the DIC to find the conjugate pairs in stereo images, the calibrated stereo vision is used to measure the strain field of a tension test specimen to evaluate its applicability to the surface deformation measurement of a deformable body.

Keyword : Stereo vision, circle grid, camera calibration, subpixel localization, conic section