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Novel projector calibration method for monocular structured light system  
based on digital image correlation

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ABSTRACT: Monocular structured light system, which consists of one camera and one digital light processing (DLP) projector, is a simple and effective tool to acquire accurate three-dimensional (3D) shapes. But such high precision is only possible if the projector is accurately calibrated. Many of the existing projector calibration methods have complicated procedures or low calibration precision. In this paper, an accurate speckle-based feature points matching method is proposed to estimate the image coordinates of feature points in projection chip (digital micro-mirror device or DMD) plane. The method relies on an uncalibrated camera and makes use of affine transformation theory and two-dimensional digital image correlation (2D-DIC) method to reach sub-pixel matching precision. Considering the skew of the projection chip, a

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