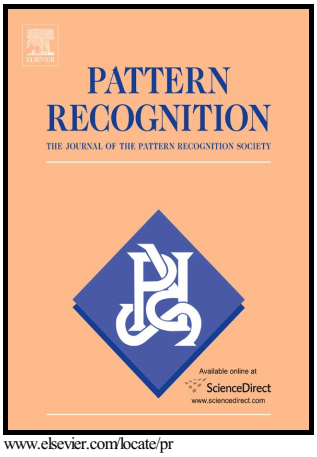

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Keypoints-based Surface Representation for 3D Modeling and 3D Object Recognition

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Abstract

The three-dimensional (3D) modeling and recognition of 3D objects have been traditionally performed using local features to represent the underlying 3D surface. Extraction of features requires cropping of several local surface patches around detected keypoints. Although an important step, the extraction and representation of such local patches adds to the computational complexity of the algorithms. This paper proposes a novel Keypoints-based Surface Representation (KSR) technique. The proposed technique has the following two characteristics: **(1)** It does not rely on the computation of features on a small surface patch cropped around a detected keypoint. Rather, it exploits the geometrical relationship between the detected 3D keypoints for local surface representation. **(2)** KSR is computationally efficient, requiring only seconds to process 3D models with over 50000 points with a MATLAB implementation. Experimental results on the UWA and Stanford 3D models dataset suggest that it can accurately perform pairwise and multiview range image registration (3D modeling). KSR was also tested

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