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Recognizing cylindrical objects by single camera views^{*1}

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Abstract

A new approach to recognition of cylindrical objects by single camera views using camera calibration, surface backprojection, and model matching techniques is proposed. Cylindrical objects to be recognized can be of different radii and heights. Both the silhouette shapes and the surface patterns of objects are utilized in the recognition scheme. A new camera calibration technique is first employed to compute the camera parameters analytically using a single camera view of the object. A surface backprojection technique is then adopted to reconstruct the pattern on the surface patch of the input object. The reconstructed surface pattern is finally matched with that of each object model, using a partial shape matching technique to find the best matching surface patch pattern of the models, from which the input object is classified accordingly. Experimental results showing the feasibility of the proposed approach are also included.

Keywords: Object recognition; Camera calibration; Surface backprojection; Model matching; Surface patterns; Partial shape matching

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