Concentric Circle Detection based on Edge Pre-Classification and Extended RANSAC

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Abstract : In this paper, we propose an effective method to detect concentric circles with imperfect edges. First, the gradient of edge pixel is coded and a 2-D lookup table is built to speed up normal generation. Then we take an accumulator to estimate the rough center and collect plausible edges of concentric circles through gradient and distance. Later, we take the contour-based method, which takes the contour and edge intersection, to pre-classify the edges. Finally, we use the extended RANSAC method to find all the candidate circles. The center of concentric circles is determined by the two circles with the highest concentricity. Experimental results demonstrate that the proposed method has both good performance and accuracy for the detection of concentric circles.

Keywords : concentric circle detection, gradient, contour, edge pre-classification, RANSAC

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