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Abstract

Edge detection is an important pre-processing step for any image processing application, object recognition and object detection. Among different edge detectors that are available, the Canny edge detector has better edge detection performance because it satisfies three main criteria which are low error rate, good localization and minimal response. In this paper, a mechanism to implement the Canny algorithm at block level with enhanced edge detection performance is proposed. By directly applying the original frame-level Canny algorithm at block level leads to more number of edges in smooth regions and to loss of important edges in highly-detailed regions since the original Canny algorithm computes the high and low thresholds based on the

frame-level statistics. To solve this problem, a new method called Distributed Canny Edge Detection algorithm is proposed which adaptively calculates the high and low thresholds based on the block type and local distribution of the gradients in a block. In the proposed algorithm, instead of finding the direction of the gradient by calculating the arctangent vertical gradient to the horizontal gradient, the value and sign of the components of the gradient is analyzed to calculate the direction of the gradient. The proposed Distributed Canny edge detection algorithm is implemented in MATLAB. The resulting image shows that the proposed block-level algorithm detects more number of edges than the original frame-level Canny algorithm.

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Computer Science

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