

An effective corner detection method using subpixel edge detector and
Gaussian filter

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Abstract

Purpose - The purpose of this paper is to develop an effective and reliable corner detection algorithm so as to extract all the desired corners successfully. In addition, the influences of edge detection method as well as smoothing technique on the overall performance of corner detection techniques are investigated.

Design/methodology/approach - In this paper, an effective corner detection algorithm based on subpixel edge detector and Gaussian filter is presented. First, a subpixel accuracy edge detector is used rather than a pixel accuracy edge detector to detect edges. Second, B-splines approximation technique is used to eliminate the staircase effect of a digital curve. Third, curvature curve derived from the edges is smoothed by a Gaussian filter.

Finally, statistical process control technique is applied to detect vertices.

Findings - The results show that spatial-moment outperforms chain code as an edge detector. Furthermore, the Gaussian filter should be used to smooth curvature curve instead of smoothing the profile of an object, because the former provides greater impact on the corner detection results.

Originality/value - In addition to object recognition, motion tracking and obstacle avoidance, the proposed method also has many important engineering and manufacturing applications such as dimensional measuring, reverse engineering, and machine vision-based computer numerical control (CNC) machining of polygonal sheet metal parts.

Keyword : Gaussian processes, Programming and algorithm theory, Signal detection, Image sensors