Abstract

In this paper, a hardware system for adaptive Canny edge detection algorithm is designed and simulated for a 128 pixel, 8-bit monochrome linescan camera. The system is designed to detect objects as they move along a conveyor belt in a manufacturing environment, the camera observe dark objects on a light conveyor belt. Here adaptive Canny algorithm is used to increase the accuracy of output objects. In traditional Canny need to set two threshold values manually, so there are some defects to different images but this paper puts forward an adaptive threshold values base on mean and median values. The output result of adaptive Canny proves its accuracy is high. There are multiple steps to implement adaptive Canny. First, Gaussian filter is used to smooth and remove noise. Second, compute the gradient magnitude. Third, non-maximum suppression is applied in which the algorithm removes pixels that are not part of an edge. Hysteresis uses two threshold values, upper and lower. A pixel will be marked as an edge if it’s gradient lies in between of lower and upper threshold values. A pixel will be discarded if it’s gradient below the lower or beyond the upper threshold values. Eventually, the
pixels gradient is between the two threshold values will be connected as marked edge.

References

Hardware Design and Implementation of Adaptive Canny Edge Detection Algorithm


Index Terms

Computer Science
Pattern Recognition

Keywords

Canny, adaptive Canny, Sobel, threshold, edge detection, linescan camera and conveyor belt.