Vertical-edge-based car-license-plate detection method

ABSTRACT

This paper proposes a fast method for car-license-plate detection (CLPD) and presents three main contributions. The first contribution is that we propose a fast vertical edge detection algorithm (VEDA) based on the contrast between the grayscale values, which enhances the speed of the CLPD method. After binarizing the input image using adaptive thresholding (AT), an unwanted-line elimination algorithm (ULEA) is proposed to enhance the image, and then, the VEDA is applied. The second contribution is that our proposed CLPD method processes very-low-resolution images taken by a web camera. After the vertical edges have been detected by the VEDA, the desired plate details based on color information are highlighted. Then, the candidate region based on statistical and logical operations will be extracted. Finally, an LP is detected. The third contribution is that we compare the VEDA to the Sobel operator in terms of accuracy, algorithm complexity, and processing time. The results show accurate edge detection performance and faster processing than Sobel by five to nine times. In terms of complexity, a big-O-notation module is used and the following result is obtained: The VEDA has less complexity by K2 times, whereas K2 represents the mask size of Sobel. Results show that the computation time of the CLPD method is 47.7 ms, which meets the real-time requirements.

Keyword: Adaptive thresholding (AT); Car-license-plate detection (CLPD); Sobel operator; Vertical edge detection algorithm (VEDA)