Abstract

In this paper, a general approach for international vehicle license plate localization and recognition is proposed. A hybrid solution is presented with combining basic machine vision techniques and neural networks. The proposed model consists of three main parts, including localization, segmentation and recognition. In the license plate localization, after some essential
preprocessing and finding edges, the 8-connectivity of image background eliminates which helps more appropriately separating of main image objects from the cluttered backgrounds. Then, it is tried to find connected objects with 8-connectivity of the differentiated binary image. The binarization of license plate is based on local binarizing. The proposed recognizing system utilizes the Hough transform, basic morphological operators and Skeletonizing to provide an appropriate input for artificial neural networks. Segment by segment, the input streams into an intelligent error control unit (IECU) which itself is an already trained multi-layer perceptron (MLP) neural network. IECU investigates empty or non-character–inside segments. In case of no error, each segment streams into two already trained MLPs. Each of them singly recognizes either the alphabets or numbers. We show that this approach achieves accuracy over 91% on localizing vehicle license plate. The image database includes images of various vehicles with different background and slop under varying illumination conditions. The character recognition system correctly recognizes alphabets with probability over 97% and over 94% in case of numbers.

Reference

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Index Terms

Computer Science
Image Processing

Key words

License plate LPR character recognition
Hough transform
neural network recognition
Multi layer perceptron
plate recognition
color segmentation
plate localization
diagonal fill
diagonal fill
edge Sobel
OCR
low pass filter Gaussian