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Automatic Detection of A License Plate by Using Wavelet Transform

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Abstract

License plate recognition is a wide demanding image processing application. We have explored the possibility by using wavelet transform to detect the location of a license plate for non-moving vehicle. The license plate is designed to have high contrast differences which can be easily seen by human eyes. The decomposed high frequency component of wavelet transform extracts high contrast part of license plate. The large magnitude peaks of high frequency component indicate the edges of the foreground character and white background. We search these edges on the horizontal and vertical directions separately. By judging the similarity of neighboring pixels of edge points, we successfully detect the location of license plate.

Key words: Contrast, License plate detection, Digital image processing,Graylevel wavelet transform.

使用小波轉換偵測車牌位置

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摘要

自動車牌辨識是項有用的數位影像處理的應用。本研究探索使用小波轉換（wavelet Transform）來偵測車牌在一部靜止的車輛中的位置，我們利用車牌高對應比的特性，並用小波轉換將這些高對比的訊號分解為高頻的信號，這些資料的頂點代了對比的位置與差別，這些特性可偵測車牌。再水平與垂直的相鄰的映像點間，對資料加以計算與比較，高對比的區域應此可以被察覺，若符合條件，車牌的位置就可以找出，反之非車牌的區域則被剔除。

關鍵詞：對比，車牌偵測，數位影像處理，灰度，小波轉換

1. Introduction

License plate is the most important identification for a vehicle. The automatic detection by using image processing is a wide-demanded application for safety or security purposes [1] [2]. The wavelet transform divides a 1-dimensional signal into two parts: low frequency part containing slow variation of original data, high frequency part with rapid changes data of original one. The 2-dimensional data, i.e. image, can be applied with wavelet transform by processing the horizontal and vertical directions, independently [3]. The license plate is designed to be easily seen by human eyes. In order to enhance the visibility, the foreground (thick black characters) and background (large white area)