Recognition and Orientation Invariant Transform for Character Image — Example for License Plate

黃淇富、蘇慶良

E-mail: 374739@mail.dyu.edu.tw

ABSTRACT

In recent years the surge of vehicles creates much problem, which include vehicleparking as well as theft and otherissues. Vehicle managementbecomes more and more important. A licenseplate presents the best information of avehicle. Thus the recognition of a license plate is very important. As the progress of technology, computer can more efficiently to recognize a license plate. In the past studies, researchers have developed various techniques to recognize a license plate. However, when a car plate is rotated or shifted, the previous techniquemight have difficulty to recognize them. Therefore, this study proposes a new method to solve this problem.In this study SONY MT11i digital camera is used to capture the images of license plates. A platformwith computer vision technology developed by Borland C is used to recognize them. The vision technology includes: (1) color conversion, normalization, noise removing, and character segmentation, (2) locating a character edge, (3) edge thinning, (4) edge sampling, (5) edge distance calculatingfrom the character mass centroid, (6) fast Fourier transform computation, and (7) pattern recognition. In this study, the character feature of each character is stored in a database. For recognize anunknown character in a licenseplate, the pattern of this character is compared with those individual character pattern, whichare stored in the aforementioned database, whereby to recognize this unknown character.

Keywords : license plate recognition,edge locating,edge thinning, fast Fourier transform.

Table of Contents

REFERENCES

中文部分: 1. 李泊禹，「線段掃描式即時多車牌偵測」，北台灣科學技術學院機電整合研究所碩士論文，2011。 2. 李正裕，「車牌辨識系統的研究」，靜宜大學資訊管理學系碩士論文，2003。 3. 黃琇晴，「應用於道路監視器之自動車牌辨識系統」，朝陽科技大學資訊工程系碩士論文，2007。 4. 秦群立，「高度光線變化影響之影像的分析及處理技術開發」，國立交通大學電機與控制工程學系博士論文，2006。 5. 莊佳龍，「車輛偵測與車牌辨識系統」，國立中正大學機電光整合工程碩士班碩士論文，2005。 6. 莊順斌，「以改良式Sobel 邊緣偵測法與密度分群為核心之產品外觀檢測系統—以車牌辨識為例」，國立屏東科技大學資訊管理系碩士論文，2004。 7. 趙仁宏，「使用小波描述子和傅立葉描述子為基礎之二維物件辨識系統」，中興大學應用數學系碩士論文，2000。 8. 張智翔，「可攜式車牌辨識系統演算法之硬體實現」，國立臺灣海洋大學電機工程學系碩士論文，2011。 9. 張銘豪，「用分割辨識方法之英文數字辨識系統」，中山大學資訊工程研究所碩士論文，1996。 10. 廖進德，「影像處理技術於車牌辨識系統之研究，大葉大學工業工程與科技管理學系碩士論文，2006。 11. 簡維皇，「用分割辨識方法之英文數字辨識系統」，中山大學資訊工程研究所碩士論文，2011。 英文部分: 1. Ching-Liang Su,“ Edge distance extraction and orientation invariant transform for object recognition ”, Expert Systems with Applications, 4696-4702, 2009. 2. Ching-Liang Su,“ Car plate recognition by whole 2-D image ”,Expert Systems with Applications, 7195-7200, 2011. 3. D.K. Yong, Y. Mei,“ An Approach to Korean License Plate Recognition Based on Vertical Edge Matching ”, IEEE International Conference on Systems, Man and Cybernetics, vol. 4,pp.2975-2980, 8-11 October, 2000. 4. W.G. Zhu, G.J. Hou, X. Jia,“ A Study of Locating Vehicle License Plate Based on Color Feature and Mathematical Morphology ”, Signal Processing, vol. 1, pp. 748-751, 2002.