A Study on Parking Management by Applying Image Analysis Techniques

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ABSTRACT

With the growth in economy, the percentage of people in Taiwan owning personal vehicles is increasing every year. The development of parking lots is unable to cope with this, Parking problems has become severe. The current parking lots manage the incoming and outgoing vehicles at the entrances and exits, charging cars at these specific points. This type of management causes long queues at these points. The way to improve the management of the parking becomes an important researching thesis. In addition to the congestion problems for entering and exiting parking lots, traditional ticketing methods require employee training, work schedule arrangement, employee payments, and other human costs, and may still have concerns over management reliability. As for ticketing employees, long hours of repetitive work may result in increasing error percentage in the long-term. Hence, automatic management is the most expected problem solution. Furthermore, parking lots often have clients with different clearance levels, requiring different entrance methods to satisfy the different wait-times and privacy protections of different clearance level clients. The vehicle licence plate is unique, like the personal identification. If this trait can be used along with fast processing computers for image analysis, it can solve many current management problems in parking lots, and manage clients of different unique clearance levels. Thus this thesis hopes to discuss the use of the image analysis techniques on parking lot applications in reducing queuing time at parking lot entrances and exits, and helping to elevate management efficiency.

Keywords : license plate detection, character segmentation, license plate recognition, character recognition

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REFERENCES

1.魏銂志，「動態多標的車牌辨識系統之研究」，私立元智大學，資訊研究所，碩士論文，2000。 2.余忠潔，「新的車牌定位方法」，私立靜宜大學，資訊管理學系，碩論文，2003。 3.陳思源，「擷取及辨識在快車道上的摩托車」，國立交通大學，資訊工程系，碩士論文，2003。 4.張仁豪，「正交軸投影法與樹狀決策在汽車牌照辨識的研究」，國立清華大學，原子科學系，碩士論文，2001。 5.王振興，「多標的汽機車車牌辨識系統之研究」，私立元智大學，資訊管理研究所，碩士論文，2003。 6.李正裕，「車牌辨識系統之研究」，私立靜宜大學，資訊管理研究所，碩士論文，2003。 7.交通部公路總局:目前國內汽、機車號牌代碼之分配原則 http://www.thb.gov.tw/main_04_06_02_body.htm 8.曾逸鴻，「應用樣型比對技術之文件影像檢索系統」，第五屆電子化企業經營管理理論暨實務研討會，May 22, 2004. 9.邱莉莉，「停車場整體服務品質研究-以台南市公十一停車場為例」，長榮大學、經營管理研究所，2002。 10.呂學博，中華民國立體停車場協會理事長，「停車場電腦收費設備選購、建置分析」。 11.柯建仲、林知行，「停車場所在位置與出入口對鄰接道路的影響」，第二屆工作科學與藝術研討會論文集，May 19, 2001。 12.張峰齊，「即時停車資訊控制與管理系統」，台灣大學，土木工程研究所，碩士論文，2003。 13.X. F. Hermida, F. M. Rodriguez, J. L. F. Lijo, F. P. Sande and M. P. Iglesias,“A system for the automatic and real time recognition of V.L.P.'s (Vehicle Licence Plate),”Lecture Notes in Computer Science, vol. 1311 , pp. 552-558, 1997. 14.Y. T. Hsu, C. B. Lin, S. C. Mar and S. F. Su,“High noise vehicle plate recognition using gray system,”Journal of Grey Systems, vol. 10, no. 3, pp.193-208, 1998. 15.N. Otsu,“A Thresholding Selection Method from Gray-Scale Histogram,”IEEE Transaction on Systems, Han, and Cybernetics, vol. 9, pp. 62-66, 1979. 16.K. Chmnongthai and T. Sirithinaphong,“Extraction of Car License Plate Using Motor Vehicle Regulation and Character Pattern Recognition,”Proceedings of the 1998 IEEE Asia-Pacific Conference on Circuits and Systems, pp. 559-562, 1998. 17.H H. A. Hegt et al.,“A High Performance License Plate Recognition System,”IEEE International Conference on Systems, Man and Cybernetics, pp. 4357-4362, 1998. 18.B. Kosko,“Neural Networks and Fuzzy Systems: A Dynamical Systems Approach to Machine Intelligence,”Prentice-Hall, pp 263-298, 1992. 19.R. C. Gonzalez and R. E.Woods, Digital Image Processing 2/e, 2004.