

A Binarization Approach for Wafer ID Based on Star-Shape Filter

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Abstract

The binarization of wafer ID image is one of the key techniques of wafer ID recognition system and its results influence the accuracy of the segmentation of characters and their identification directly. The process of binarization of wafer ID is similar to that of the car license plate characters. However, due to some unique characteristics, such as non-uniform illumination, the unsuccessive strokes of wafer ID, it is more difficult to make of binarization of wafer ID than the car license plate characters. In this paper, a wafer ID recognition scheme based on Star-shape filter is proposed to cope with the serious influence of uneven luminance. The testing results show that our proposed approach is efficient even in situations of overexposure and underexposure the wafer ID with high performance.

Keywords: binarization, wafer ID, star-shape filter, car license plate

References

- [1] S. H. Shaikh, A. Maiti, and N. Chaki, "Image binarization using iterative partitioning: A global thresholding approach," in *Recent Trends in Information Systems (ReTIS), 2011 International Conference, 2011*, pp. 281-286.
- [2] V. Sokratis, E. Kavallieratou, R. Paredes, and K. Sotiropoulos, "A hybrid binarization technique for document images," *Learning Structure and Schemas from Documents*, vol. 3163, pp. 165-179, 2011.
- [3] S. Cunzhaoh, X. Baihua, W. Chunheng, and Z. Yang, "Adaptive Graph Cut Based Binarization of Video Text Images," in *Document Analysis Systems (DAS), 2012 10th IAPR International Workshop, 2012*, pp. 58-62.
- [4] J. Shi, N. Ray, and H. Zhang, "Shape based local thresholding for binarization of document images," *Pattern Recognition Letters*, vol. 33, pp. 24-32, 2012.
- [5] H. Chen and R. Gururajan, "Otsu's Threshold Selection Method Applied in De-noising Heart Sound of the Digital Stethoscope Record," in *Advances in Information Technology and Industry Applications, 2012*, pp. 239-244.
- [6] B. Singh, V. Chand, A. Mittal, and D. Ghosh, "A Comparative Study of Different Approaches of Noise Removal for Document Images," in *Proceedings of the International Conference on Soft Computing for Problem Solving (SOCPROS 2011), 2012*, pp. 847-854.
- [7] P. Stathis, E. Kavallieratou, and N. Papamarkos, "An evaluation survey of binarization algorithms on historical documents," in *Pattern Recognition, 2008. ICPR 2008. 19th International Conference, 2008*, pp. 1-4.
- [8] F. Chun Che and R. Chamchong, "A Review of Evaluation of Optimal Binarization Technique for Character Segmentation in Historical Manuscripts," in *Knowledge Discovery and Data Mining, 2010. WKDD '10. Third International Conference on, 2010*, pp. 236-240.
- [9] M. Sezgin and B. Sankur, "Survey over image thresholding techniques and quantitative performance evaluation," *Journal of Electronic Imaging*, vol. 13, pp. 146-168, 2004.
- [10] T. R. Singh, S. Roy, O. I. Singh, T. Sinam, and K. Singh, "A New Local Adaptive Thresholding Technique in Binarization," *International Journal of Computer Science Issues*, vol. 8, pp. 271-277, 2011.

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- [11]X. Chen, K. Wang, and Q. Wang, "An adaptive binarization method for camera based document image," *Software Engineering and Knowledge Engineering: Theory and Practice*, vol. 162, pp. 677-684, 2012.

