{tag} {/tag}International Journal of Computer Applications
Foundation of Computer Science (FCS), NY, USA

Volume 156
-
Number 1

Year of Publication: 2016

Authors:

Rashmi Saini

10.5120/ijca2016912354

{bibtex}2016912354.bib{/bibtex}

Abstract

Thresholding is a simple but effective technique for image segmentation. In this paper, a novel method is presented to address the problem of image segmentation for uneven lighting images that is based on dynamic size of window. In pyramid approach (window merging), segmentation accuracy depends on the initial size selection. The proposed method is based on the concept of window growing approach, in which after selecting the initial window, selection criterion is tested. If a sub-image or window does not satisfies the selection criterion, instead of merging with neighboring window (pyramid approach), window is incremented by small value. This process is repeated until it satisfies the given selection criterion. Thereafter segment the window by thresholding method. In the proposed method, initial size of window is computed at run time, which is based on image statistics. This method provides superior image segmentation over existing thresholding methods for images that are degraded, uneven illumination and suffer from the problem like shadow.

References

1. N. Otsu, “A threshold selection method from gray-level histograms”, IEEE Transaction on Systems Man and Cybernetics (SMC), Vol. 9, pp. 62-66, 1979
2. Q. Huang, W. Gao, W. Cai, “Thresholding technique with adaptive window selection for uneven lighting image”, Pattern Recognition Letters, Vol. 26, pp. 801-808, 2005.
3. Graham Leedham, Chen Yan, Kalyan Takru, Joie Hadi Nata Tan and Li Mian, “Comparison of Some Thresholding Algorithms for Text/Background Segmentation in Difficult Document Images”, IEEE International conference on Document Analysis and Recognition (ICDAR), pp.859-864, 2003.
4. Zuoyong Li, Yong Cheng, Chuancai Liu, Cairong Zhao, “Minimum Standard Deviation Difference-Based Thresholding”, IEEE International Conference on Measuring Technology and Mechatronics Automation (ICMTMA), Vol. 2, pp. 664-667, 2010.
5. P. Kanungo, P. K. Nanda, A. Ghosh, “Parallel Genetic Algorithm based adaptive thresholding for image segmentation under uneven lighting conditions” IEEE International Conference on System Man and Cybernetics (ICSMC), pp. 1904-1911, 2010.
6. D. Bradley and Roth , “Adaptive thresholding using Integral image” Journal of graphics tool Vol. 12(2), pp. 13-21, 2007.
7. Satyabrat Srikumar, Mamta Wagh, P.K. Nanda, “Adaptive Windowing and Granular Computing based Image Segmentation”, IEEE International Conference on Energy Automation and Signal (ICEAS), pp. 1-5, 2011
8. J. Sauvola, M. Pietikainen, “Adaptive Document Image Binariation”, Pattern Recognition, Vol. 33, pp. 225- 236, 2000.
9. Pierre D. Wellner “Adaptive thresholding for digital desk” Technical Report(EPC) pp. 93-110, 1993
10. Bilal Bataineh, Siti Norul Huda, Sheikh Abdullah, Khairuddin Omar, “An adaptive local binarization method for document images based on a novel thresholding method and dynamic windows”, Pattern Recognition Letters Vol. 32, pp. 1805-1813, 2011.
11. Mehmet Sezgin, B. Sankur, “Survey over image thresholding techniques and quantitative performance evaluation”, International Journal of Electronic Imaging(IJEI) Vol. 13 No. 1, pp.146-165, 2004.
12. W. Niblack, “An Introduction to Digital Image Processing”, Prentice Hall, Englewood Cliffs, 1986.
13. Nikhil R.Pal and Sankar K.Pal, “A review on Image segmentation techniques”, Pattern Recognition Vol. 26 No. 9 pp. 1277-1294, 1993.
14. Feixiang Yan, Hong Zhang, C. Ronald Kube “A multistage adaptive thresholding method” Pattern Recognition Letters 26 , pp. 1183–1191, 2005.
15. Faisal Shafait, Daniel Keysersa, Thomas M. Breuel, “Efficient Implementation of Local Adaptive Thresholding Techniques Using Integral Images”, Proceedings of the International Society for Optical Engineering(SPIE), Vol. 68, pp. 510-516, 2008.
16. Sahoo, P.K., Soltani, S., Wong, “ SURVEY: A survey of thresholding techniques” ,Computer Vision Graphics and Imahe Processing vol. 41, pp.233-260,1988.
17. Spann, M., Wilson, R. “ A quad tree approach to image segmentation which combines statistical and spatial information” Pattern Recognition 18, pp. 257-269, 1985.
18. Tsai, W.H.,” Moment –preserving thresholding : A new approach,”Computer Vision Graphics and Imahe Processing vol.29, pp.377-393, 1985.
19. Naveed Bin Rais, M. Shehzad Hanif and rmtiaz A. Taj, “Adaptive Thresholding

Technique for Document Image Analysis", 8th IEEE International Multitopic Conference, Vol. 3, pp. 61-66, 2004.

20. W. A. Yasnoff, J. K. Mui, and J. W. Bacus, "Error measures for scene segmentation," Pattern Recognition, vol. 9(4), pp.217-231, 1977

Index Terms

Computer Science Image Processing

Keywords

initial size selection; sub-image.