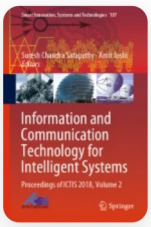
Performance Evaluation of Image Segmentation Process for Recognition of Leukemia

| Conference paper | First Online: 15 December 2018

| pp 499–509 | Cite this conference paper



Information and Communication Technology for Intelligent Systems

M. V. Rege, B. W. Gawali & Santosh Gaikwad

Part of the book series: Smart Innovation, Systems and Technologies ((SIST,volume 107))

Abstract

In the era of medical science, leukemia detection is done by observing and examining the blood sample manually by the hematologist under microscope. This manual examination method has some limitations, it is time consuming and costly. Variability of the leukemia detection manually results may be affected by the factors such as hematologist experience and tiredness. The computational technology enhanced toward medical research, and substantial

research work has been done toward analysis of leukemia. It is a difficult task as 100% detection of leukemia disease with the usual pathological process. This research work examined the analysis of leukemia detection in the context of computational contour-based image segmentation, Otsu's image segmentation and k-means image segmentation approach. The performance of image segmentation is evaluated on the basis of features-based approach such as area, perimeter, solidity, and eccentricity. The tested performance is calculated on the basis of variation in features value of original image and leukemia image. The comparative performance of the above techniques is described. The Otsu's image segmentation is more dominant than k-means and counter image segmentation approach. Otsu's segmentation approach is given the 100% successful segmentation for the leukemia blood sample image dataset.

References

1. Mohapatra, S., Patra, D., Satpathi, S.: Image analysis of blood microscopic images for acute leukemia detection. In: IEEE International Conference on Industrial Electronics, Control and Robitics, pp. 215–219 (2010)

Google Scholar

2. Ravi, M., Hegadi, R.S.: Detection of glomerulosclerosis in diabetic nephropathy using contour-based segmentation. In: International Conference on Advanced Computing

Technologies and Applications (2015)

Google Scholar

3. Takiar, R., Nadayil, D., Nandkumar, A.: Projection of number of cancer cases in India (2010–2020) by cancer groups. Asian Pac. J. Cancer Prev. 11(4), 1045–1049 (2010)

Google Scholar

4. Huang, H.K.: Biomedical image processing (1981) PMID: 7023828 [PubMed—indexed for MEDLINE] 5(3), 185–271 (1981)

Google Scholar

5. Rangayyan, R.M., Kamenetsky, l., Benediktsson, H.: Segmentation and analysis of the glomerular basement membranein renal biopsy samples using activecontours. J. Digit. Imaging (2009). https://doi.org/10.1007/s10278-009-9188-6

Article Google Scholar

6. Kamenetsky, I., Rangayyan, R.M., Benediktsson, H.: Analysis of the glomerular basement membrane in images of renal biopsies using the split-and-merge method: pilot study (2009)

Article Google Scholar

7. Image Database (online). www.medscape.com

8. Mumford, D., Shah, J.: Optimal approximation by piecewise smooth functions an associated variation problems. Comm. Pure Appl. Math 42, 577–685 (1989)

Google Scholar

9. Szpak, Z.L., Tapamo, J.R.: Further optimization for the Chan-Vese active contour model. In: High Performance Computing and Simulation Conference (2008)

Google Scholar

10. Image database (online). www.ncbi.nlm.nih.gov

11. Sonka, M., Hlavac, V., Boyle, R.: Image Processing, Analysis, and Machine Vision. PWS Publishing (1999)

Google Scholar

12. Dr. Das, S.: Lecture Notes, IIT Madras, India. http://vplab.iitm.ac.in/courses/CV_DIP/PDF/lect-Segmen.pdf

13. Elder, J., Zucker, S.: Computing contour closures. In: Proceedings of European Conference on Computer Vision, vol. I, Cambridge, England, pp. 399–412 (1996)

Google Scholar

14. Jacobs, D.: Robust and efficient detection of salient convex groups. IEEE Trans. Pattern Anal. Mach. Intell. 18(1), 23–37 (1996)

Article Google Scholar

15. Khan, S.S., Ahmad, A.: Cluster centre initialization algorithm for K-means cluster. In:

Pattern Recognition Letters, pp. 1293–1302 (2004)

Google Scholar

16. Sezgin, M., Sankur, B.: Survey over image thresholding techniques and quantitative performance evaluation. J. Electron. Imaging 13(1), 146–165 (2004). https://doi.org/10.1117/1.1631315

Article Google Scholar

Author information

Authors and Affiliations

Department of CS & IT, Dr. B.A.M. University, Aurangabad, Maharashtra, India
M. V. Rege & B. W. Gawali

Department of Computer Science, Model College, Ghansawangi, Jalna, Maharashtra, India
Santosh Gaikwad

Corresponding author

Correspondence to M. V. Rege .

Editor information

Editors and Affiliations

School of Computer Engineering, KIIT Deemed to be University, Bhubaneswar, India
Suresh Chandra Satapathy

Sabar Institute of Technology, Gujarat Technological University, Ahmedabad, Gujarat, India
Amit Joshi

Rights and permissions

Copyright information

About this paper

Cite this paper

Rege, M.V., Gawali, B.W., Gaikwad, S. (2019). Performance Evaluation of Image Segmentation Process for Recognition of Leukemia. In: Satapathy, S., Joshi, A. (eds) Information and Communication Technology for Intelligent Systems . Smart Innovation, Systems and Technologies, vol 107. Springer, Singapore. https://doi.org/10.1007/978-981-13-1747-7_48

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-981-13-1747-7_48

Published
15 December 2018

Publisher Name
Springer, Singapore

Print ISBN
978-981-13-1746-0

Online ISBN
978-981-13-1747-7

eBook Packages
Intelligent Technologies and Robotics
Intelligent Technologies and Robotics (R0)

Publish with us

Policies and ethics