INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

A Monthly Double-Blind Peer Reviewed Refereed Open Access International e-Journal - Included in the International Serial Directories
Indexed & Listed at:
Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Cabell's Directories of Publishing Opportunities, U.S.A.
as well as in Open J-Gage, India [link of the same is duly available at Inflibnet of University Grants Commission (U.G.C.)]
Registered & Listed at: Index Copernicus Publishers Panel, Poland
Circulated all over the world & Google has verified that scholars of more than 1500 Cities in 141 countries/territories are visiting our journal on regular basis.
Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA
www.ijrcm.org.in

CONTENTS

CALL FOR MANUSCRIPTS

Weinvite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email address: **infoijrcm@gmail.com**.

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION:**

DATED: _____________

THE EDITOR
IJRCM

Subject: **SUBMISSION OF MANUSCRIPT IN THE AREA OF .**

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript entitled '____' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

NAME OF CORRESPONDING AUTHOR:
Designation:
Affiliation with full address, contact numbers & Pin Code:
Residential address with Pin Code:
Mobile Number (s):
Landline Number (s):
E-mail Address:
Alternate E-mail Address:

NOTES:
a) The whole manuscript is required to be in ***ONE MS WORD FILE*** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
b) The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:
New Manuscript for Review in the area of (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/ Engineering/Mathematics/other, please specify)
c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
d) The total size of the file containing the manuscript is required to be below **500 KB**.
e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE**: The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS**: The author (s) **full name**, **designation**, **affiliation** (s), **address**, **mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT**: Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS**: Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.

6. **MANUSCRIPT**: Manuscript must be in ***BRITISH ENGLISH*** prepared on a standard A4 size ***PORTRAIT SETTING PAPER***. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.

7. **HEADINGS**: All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.

8. **SUB-HEADINGS**: All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.

9. **MAIN TEXT**: The main text should follow the following sequence:

   INTRODUCTION

   REVIEW OF LITERATURE

   NEED/IMPORTANCE OF THE STUDY

   STATEMENT OF THE PROBLEM

   OBJECTIVES

   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

   RECOMMENDATIONS/SUGGESTIONS

   CONCLUSIONS

   SCOPE FOR FURTHER RESEARCH

   ACKNOWLEDGMENTS

   REFERENCES

   APPENDIX/ANNEXURE

   It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed ***5000 WORDS***.

10. **FIGURES &TABLES**: These should be simple, crystal clear, centered, separately numbered &self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

11. **EQUATIONS**:These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

12. **REFERENCES**: The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:

- All works cited in the text (including sources for tables and figures) should be listed alphabetically.
- Use (**ed.**) for one editor, and (**ed.s)** for multiple editors.
- When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
- Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
- The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
- For titles in a language other than English, provide an English translation in parentheses.
- The location of endnotes within the text should be indicated by superscript numbers.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:

BOOKS

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, KurukshetraUniversity, Kurukshetra.

ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

IMAGE EDGE DETECTION USING MORPHOLOGICAL OPERATION

PADMANJALI. A.HAGARGI
RESEARCH SCHOLAR, VTU, BELGAUM
ASST. PROFESSOR
GURU NANAK DEV ENGINEERING COLLEGE
BIDAR

DR. SHUBHANGI.D.C
ASST. PROFESSOR
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
PDA COLLEGE OF ENGINEERING
GULBARGA

ABSTRACT

Edges define the boundaries between regions in an image, which helps with segmentation and object recognition. The usual existing edge detection methods like LoG, Canny, Sobel, Prewitt etc. They make use of maximal gradient value or zero-crossing point of second-order derivatives operator or appropriate threshold value obtain image edge. They all belong to high pass filter and unsuitable to detect the noise corruption of the medical image, because noise and edge are located in high frequency domain. Morphological edge detectors involve simple addition/subtraction operations and max/min operations. Since different edge detectors work better under different conditions, it would be ideal to have an algorithm that makes use of multiple edge detectors, applying each one when the scene conditions are most ideal for its method of detection. In order to create this system, it is first required to know which edge detectors perform better under which conditions. Clear edges can show where shadows fall in an image or any other distinct change in the intensity of an image. The process of extraction of these feature points is called edge detection.

KEYWORDS
edgedetection; multi-scalestructure element; Magnetic Resonance Images; Mathematical Morphology.

I. INTRODUCTION

Image edge detection is an important work for modern medical image process. The purpose of edge detection confirms the edge of objective contour in noise image. The result of edge detection affects the next diagnoses and therapy [1]. The usual methods are: Log operator, Canny operator, Sobel operator, Prewitt operator etc. They make use of maximal gradient value or zero-crossing point of second-order derivatives operator or appropriate threshold value obtain image edge. They all belong to highpass filter and unsuitable to detect the noise corruption of the medical image, because noise and edge are located in high frequency domain. In practical application medical image usually includes objective edge, objective shadow and noise, so it is difficult to separate edge from noise and the other jamming.

Morphological edge detectors involve simple addition/subtraction operations and max/min operations. Since different edge detectors work better under different conditions, it would be ideal to have an algorithm that makes use of multiple edge detectors, applying each one when the scene conditions are most ideal for its method of detection. In order to create this system, it is first required to know which edge detectors perform better under which conditions.

In this paper, anew morphological method based multiscale edge detection is proposed to detect edge. It gains the better image edge via changeable structure elements. The experimental results show that the new algorithm is more efficient.

II. THE TRADITIONAL MORPHOLOGICAL EDGE

DETECTION OPERATION

The corrected resistances to noise operations are:

$OMEI = (f \bullet B) \circ B - (f \bullet B) \odot B$ (1)

$OMDI = (f \circ B) \oplus B - (f \circ B) \bullet B$ (2)

When the corrected resistance to noise operations OMEI and OMD1 detect edge, responses are all zero for positive and negative pulse to filter noise effectively. But blurred edge is gained [9]. To decrease edge fuzzy performance, to gain better image edge details and restrain capacity of noise, the modified morphological edge detection operations are shown as follow:

When the corrected resistance to noise operations OMEI and OMD1 detect edge, responses are all zero for positive and negative pulse to filter noise effectively. But blurred edge is gained [9]. To decrease edge fuzzy performance, to gain better image edge details and restrain capacity of noise, the modified morphological edge detection operations are shown as follow:

$E_{min} = \min \{ OME1, OMDI \}$ $E_{max} = \max \{ OME1, OMD1 \}$ $E_d = E_{max} - E_{min}$ (3)

Improved morphological edge detection operation is defined by the expression:

$ED = OMD1 + E_d$ (4)

Fuzzy edge is decreased by iterating some edge details of the improved operation. The increased ability of noise rejection and the better edge image lie on the changeable structure elements.

III. THE NEW ALGORITHM OF MORPHOLOGICAL

EDGE DETECTION

A. Algorithm Description

The result is directly influenced by the selected structure element [10-12].In this paper original image is divided into two parts: objection f' and background f2. The part which is larger than the threshold uses large-scale structure element to detect the edge, and uses small-scale structure element for the part less than the threshold. The large-scale structure element is obtained via dilating small-scale structure element and MSE (Mean-Squared Error) and PSNR (Peak Signal-to-Noise Ratio). It can be defined as in (11) and (12):

$$MSE = \frac{\sum_{0 \le i < M} \sum_{0 \le j < N} (f - f`)2}{M \times N} \quad (5) \quad (10)$$

$$PSNR = \frac{10\log_{10} 256 \times 256}{MSE} \quad (6)$$

Where the adjusting factor is a, f′ is original image and processed image respectively, M and N is image size. Edge image is obtained via large and small-scale morphological operations additive combination:

$$f'(x, y) = w_1 * ED_1(x, y) + w_2 * ED_2(x, y) \quad (7)$$

Where f (x, y) is the combined edge image, w_1 nd w_2 are weights.

B. Methodology Overview

Based on foregoing analyses, the better image edge is obtained in terms of algorithm which is shown as below:

1) *Select threshold:* Firstly, we estimate an approximate threshold to be regarded as initial value; secondly, segment the image to gain sub-image, then select a new threshold via character of sub-image. The image is segmented by the new threshold after several iterations; finally, the result including the less false partition is gained. The method is better than direct partition for initial threshold. The key is that update threshold. .

2) Select limited structure element B: Bi is the large-scale structure element which is obtained from dilating small-scale structure element B: B_i = B. B----- .B, (i = 2 ,3 ,4….n)

3) Compute MSE and PSNR on the basis of (6) and (7): If MSE <M (M is expected value), continue to step 4, or i=i+l to step 2

4) Detect the edge ED ED2 of f' and f2 in terms of step2

5) Additive combination ED, ED2 to gain edge image based on formula (7):

In this paper non-mean weight is adopted to detect the better edge image and filter noise. Different scale possesses different ability of noise rejection to confirm the weight w_1 and are w_2 in (7) [13]:

1) The synthetic operations of open-close filter noise using the structure element in step 2:

The respective mean image is obtained:

$$e_l = \frac{f \bullet B \circ B + f \circ B \bullet B}{2}$$

$$e_2 = \frac{f \bullet B_i \circ B_i + f \circ B_i \bullet B_i}{2}$$

2) Compute image standard deviations:

$$\Delta l = |f - el| \qquad \Delta 2 = |f - e2|$$

and variances

$$\Delta l^2 = |f - el|^2 \qquad \Delta 2^2 = |f - e2|^2$$

3) Confirm weight in terms of standard deviations and variances of different scale image:

$$W_1 = \frac{\Delta 2}{\Delta l + \Delta} \text{ or } W_1 = \frac{\Delta 2^2}{\Delta l^2 + \Delta 2^2}$$

$$W_2 = \frac{\Delta 1}{\Delta l + \Delta 2} \text{ or } W_2 = \frac{\Delta 1^2}{\Delta l^2 + \Delta 2^2}$$

That is, in inverse proportion to the difference between selected weight and corresponding image. The weight of large-scale is larger than small-scale.

IV. EXPERIMENT

The source image used for simulating experiment is shown in Fig.2 (a). It is MRI (Magnetic resonance image) of brain tumor; the size is 467 X 529.The proposed algorithm as above detects Gaussian and salt & pepper noise corrupted image edge. The selected structure element is 3 X 3 cross.

FIGURE: 1: a) ORIGINAL IMAGE

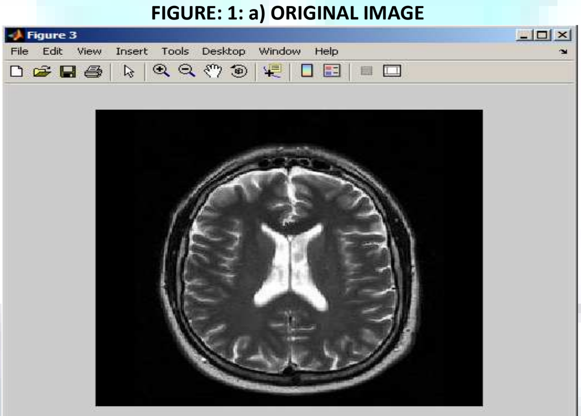
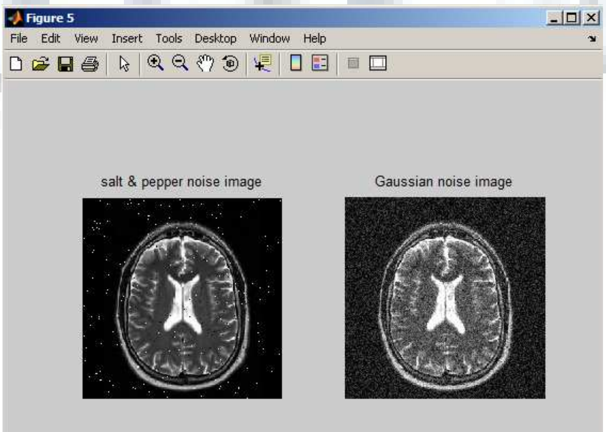


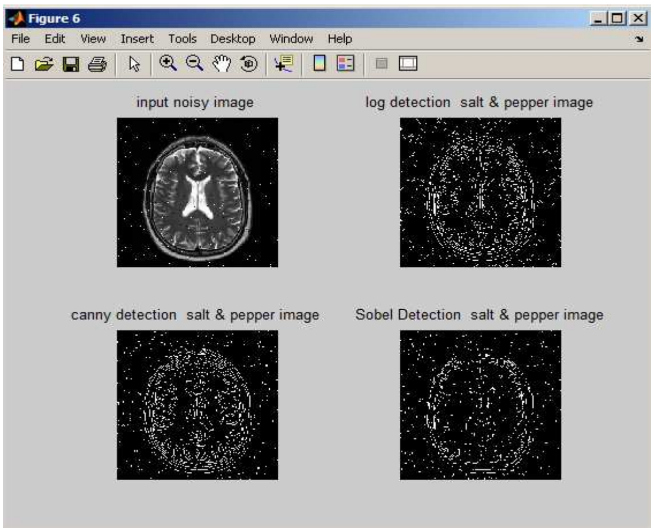
FIGURE 2: GAUSSIAN NOISE AND SALT & PEPPER CORRUPTED IMAGE



A. Comparison with widely known methods

To testify the effectiveness of the proposed algorithm, we detect edge for Gaussian and Salt & pepper noise corrupted image using the traditional gradient-based operations: Canny, Laplacian of Gaussian and Sobel methods and the proposed method in the study. The result is shown as follow:

FIGURE 3: RESULTS OF SALT & PEPPER CORRUPTED IMAGE DETECTION



B. Noise corrupted image detection

From the experimental results Fig.2 and Fig.3, we think that the better edge is gained, the more dilation numbers, the focus of infection is clear. It helps doctor to make sure the state of illness ponderance and confirm how to cure. Circular iteration is needed in dilation. This increases the computational time of processing. It is very important to select suitable dilation times.Different image selects different dilation times to gain better detection edge. Image. The dilation results are as follows:

FIGURE 4: FIRST DILATION OF IMAGE

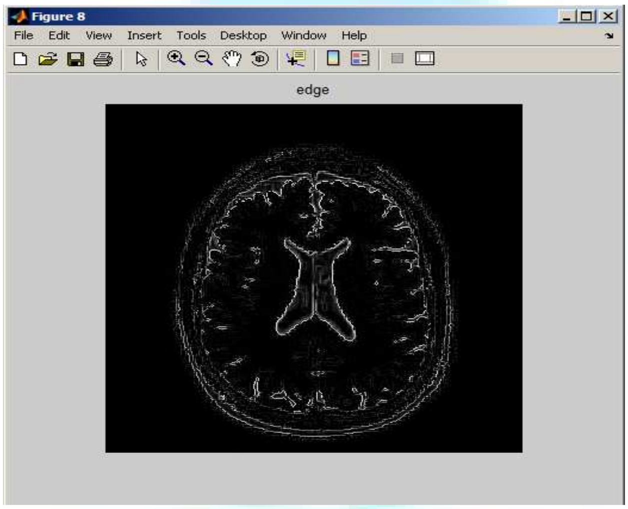


FIGURE 5: SECOND DILATION OF IMAGE

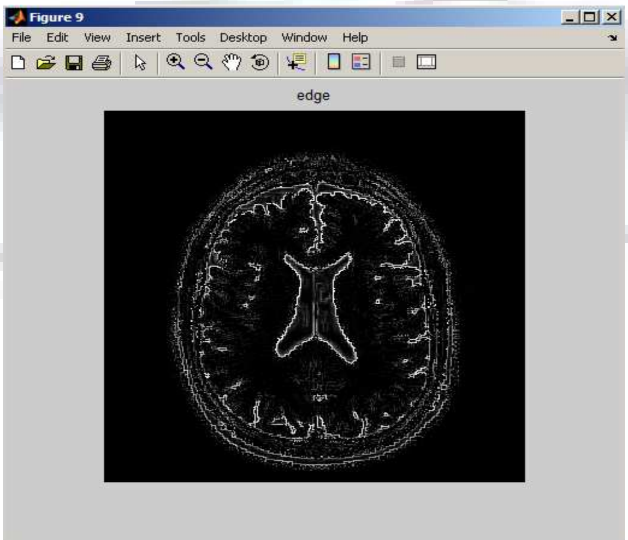
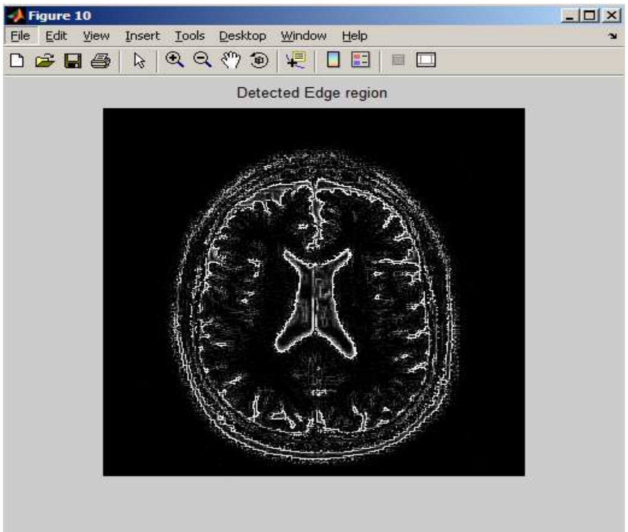


FIGURE 6: CLEAR DETECTION IMAGE EDGE USING MORPHOLOGICAL OPERATION



C. Computational comparisons

The comparisions of widely known methods is compared using our alogirithmic method is an shown in the graph for both salt & pepper and Gaussian noised images:

FIGURE 7: THE RESULTS OF GAUSSIAN CORRUPTED IMAGE DETECTION

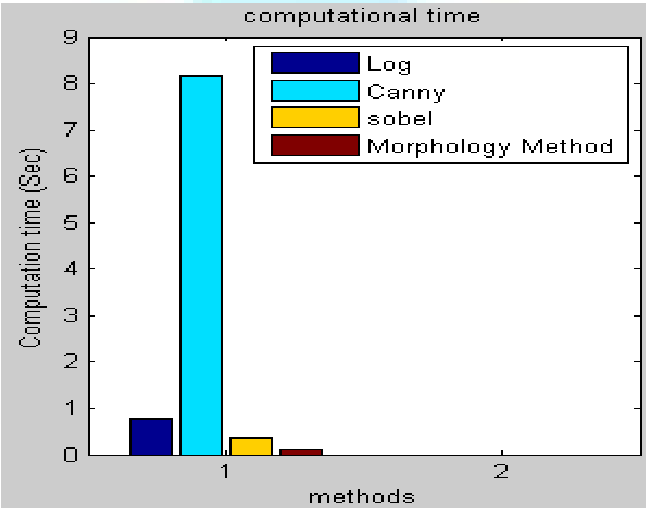


FIGURE 8: THE RESULTS OF SALT & PEPPER NOISE CORRUPTED IMAGE DETECTION

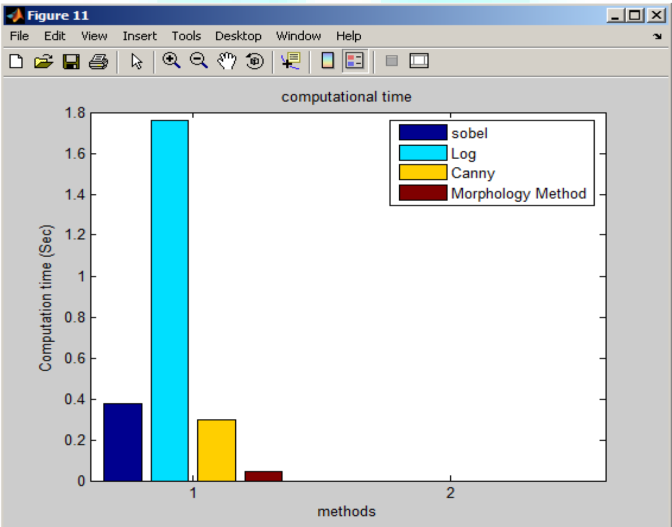


Fig.1a is noise corrupted image. Fig.3 show the results obtained with Log edge detection, Canny edge detection, Sobel edge detection and our proposed method is as shown in fig.4,5 & 6 as first dilation second dilation and finally the detected edge. It is can be seen from these figures that the edge image obtained with our method detected clearer edge which is not detected by Canny method, Log method and sobel method. It is sensitive to noise for widely known methods. The edge obtained with Sobel that is not integrated; Log has weak edge location; Canny detects the thinner edge and discontinuous focus of infection. All of them are not benefit for the research of infection focus. Our proposed method can obtain clearer edge for infection focus where the two noises corrupted (Gaussian and Salt & pepper noise) image. It is not sensitive to noise and in favor of analyzing state of an illness and later cure. It is can be seen from these figures and under noisy condition, our method can still get better image, and less the calculation time, than the well-known Canny, Laplacian of Gaussian and Sobel methods.

V. CONCLUSION

Image edge is not clear for some pathology or any other field in special reason. The clear edge is important to cure illness. In this paper original image is divided into two parts: objection and background. The part which is larger than the threshold uses large-scale structure element to detect the edge, and uses small-scale structure element for the part less than the threshold. Large-scale structure element is obtained by dilating small-scale structure element.

The experimental results show in fig.3, is that the algorithm is more efficient for even medical image denoising and edge detecting than the usually used gradient-based edge detection algorithms such as Log operation and Sobel edge detector, and Canny operation and is very efficient method as shown in the fig 7& 8 for Gaussian and Salt & pepper corrupted image.

Edge detection is an important task in any image analysis system. The response of the conventional edge detectors are largely dependent on the size of spatial filters (area of support) and the threshold (cut off level) used. The choices of those parameters remain heuristic due to the absence of proper image model. This problem is greatly reduced when a multi-scale approach for integrations of edge information, obtained from various size of filters, is used. The present work proposed morphological operation based on multi-scale edge detector.

It is shown that the proposed detector has better noise immunity and orientation and positional response compared to most of the conventional morphologic edge detectors. This present work is computationally less expensive and is more efficient and effective than sophisticated edge detectors like Log, Canny and Sobel edge detector, with comparable result. They all belong to high-pass filter and unsuitable to detect the noise corruption of the medical image, because noise and edge are located in high frequency domain.

The proposed work detects fine edge with cleared Gaussian and salt & pepper noise corrupted image which is very helpful for any practical applications

VI. FUTURE SCOPE

The present work can be extended to work with different types of noises. It can be enhanced to work more with natural image segmentation. It can be implemented in many practical applications like to help doctors to make sure the state of illness and confirm how to cure detect any bone fracture. This work in future can also be used to work in most Image Processing applications to obtain information from frames as precursor step to feature extraction and object segmentation. It can be extended to work on many different practical applications of image edge detection.

- Multi-Scale edge detection in Machine Vision Gauging applications such as inspection for missing parts, measurement of critical part dimensions using gauging, and identification and verification of electronic user interface displays.
- This technique is also used in a Mobile Robot Vision System, it is of vital importance to separate objects from the background. This needs firstly to extract edges from the images collected by the mobile robot

VII. REFERENCES

1. A P Richard. "A New Algorithm for Image Noise Reduction Using Mathematical Morphology" .IEEE Transaction on Image Processing. 1995:4(3),554-568
2. Bob Fisher, Simon Perkins, Ashley Walker, Erik Wolfart, "Sobel Edge Detector." Internet: http://www.cee.hw.ac.uk/hipr/html/sobel.html, 1994, [cited 2007 June 13].
3. Harris, C. and M. Stephens. "A Combined Corner and Edge Detector". Fourth Alvey Vision Conference, pp.147-151, 1988.
4. J. F. Canny. "Finding edges and lines in images. Master's thesis", MIT. AI Lab. TR-720, 1983.
5. J. F. Canny. A computational approach to edge detection. IEEE Trans. Pattern Analysis and Machine Intelligence, 8(6):112–131, 1986.
6. John C. Russ, "The Image Processing Handbook", Chapter 3,4,6,7.
7. Kenneth R. Castleman, "Digital Image Processing", Chapter 6,7,18.
8. Kovesi, Peter, "Edges are not just steps", Department of Computer Science, University of Western Australia, January 2002, http://www.cs.uwa.edu.au/pub/robvis/papers/pk/ACCV62.pdf
9. LIU Xun; YOU Zhi-sheng. An Image Edge Detection Method Based on Multi-Scale Morphology [J]. Opto-electronic Engineering. 2003, 30(3):56-58Vol. 17, 1996, pp. 1057-1063.
10. Lu Guanming Li Shuhong.Multiscal Morphological Grodient Algorithm And Its Application In Image Segmentation [J]. Signal Processing, 2001, 2(7):37-41

D. Marr and E. C. Hildreth. Theory of edge detection. Proceedings of the Royal Society, London B, 207:187–217, 1980.

11. R. A. Owens, S. Venkatesh, and J. Ross. Edge detection is a projection. Pattern Recognition Letters, 9:223–244, 1989.
12. Robyn Owens, "Mathematical Morphology." Internet: http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/OWENS/LECT3/node 3.html, 1997, [cited 2007 June 13].
13. Sonka, Milan, "Digital Image Processing: Chapter 5, Part 1 Segmentation: Thresholding", University of Iowa, Class 55:148 Digital Image Processing. Lecture Notes, http://www.icaen.uiowa.edu/~dip/LECTURE/Segmentation1.html
14. William Green, "Edge Detection Tutorial." Internet: http://www.pages.drexel.edu/~weg22/edge.html, 2002, [cited 2007 Apr 5].
15. Woods, Richard, Gonzalez, Rafael, "Digital Image Processing", Second Edition, Prentice Hall, 2002
16. Yang Shubin, Peng Fuyuan Application of Morphological Edge Detectors in Image Corrupted by Noise [J]. Computer Engineering and Applications. 2002, 30 (17): 91-92.
17. Zhao Yu-qian, Gui Wei-hua, Chen Zhen-cheng, Tang Jing-tian and Li Ling-yun, "Medical Images Edge Detection Based on Mathematical Morphology," in Proc. IEEE-EMBS, 2005, pp. 6492-6495.

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Computer Application and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail **infoijrcm@gmail.com** for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail infoijrcm@gmail.com.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals