

Segmentation Stroke Objects based on CT Scan Image using Thresholding Method

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Abstract — Brain image segmentation is one of the most important parts from a clinical diagnostic tool to determine the characteristics of a particular stroke type. Find anatomical contours and the location of the stroke to characterize the type of stroke perfectly in segmentation is very difficult this research proposes an approach to image segmentation by the process of separating objects from other objects in CT Scan images. CT scan image segmentation uses the thresholding method with the Binarization process. Implementation of the Threshold method is Global binary thresholding, and Otsu thresholding. Preprocessing images to make repairs before segmentation. The dataset is used from Surabaya Haji General Hospital and public data. The results of this experiment is improved image evaluated using peak signal-to-noise ratio (PSNR) and mean-square error (MSE), the best results were seen in bilateral filtering with a PSNR value of 69% MSE which was the lowest 0.008%. The best stroke object segmentation results using Otsu Thresholding by determining the lower threshold with a High Value of ≤ 170 .

Keywords – Stroke, Segmentation, Thresholding, Noise removal

I. INTRODUCTION

Type of stroke is divided into two types of ischemic stroke when the blood supply to part of the brain is suddenly interrupted, the Stroke Hemorrhagic when the brain blood vessels rupture. Computed Tomography Scanning / CT Scan is one of the diagnostic tests performed to find out how the brain is seen when a stroke occurs. CT scan images that have a thick size will produce a picture with low detail, on the contrary a thin size will produce high detail. If the thickness rises, artifacts will arise and if too thin there will be noise [1][2].

Brain image segmentation is one of the most important parts of a clinical diagnostic tool. Finding the anatomic contour and location of the stroke to characterize the type of stroke perfectly in segmentation is very difficult. this research proposed an approach to image segmentation with the process of separating the object from the location of the stroke with other objects from the CT Scan image. CT scan image segmentation is performed using the Thresholding method with the binary process. The threshold method that will be implemented to be compared is adaptive thresholding, Global binary thresholding, Otsu thresholding.

Before doing segmentation, image repairs will be done, because the CT scan of the brain contains mostly noise, artifacts. It is important to remove noise before image segmentation start. the most common noise seen in CT images

are Salt and Pepper noise, Speckle noise, Gaussian noise [3][4]. Image repair will be done by applying Noise Removal to CT scan images. Filters that will be implemented are median Filtering, Gaussian Filtering and Bilateral Filtering. from the three filters the Best filter will be taken for Image repair Performance is evaluated using Peak Signal-to-Noise Ratio (PSNR) and Mean Squared Error (MSE). The best results will be implemented in Stroke Object Segmentation.

II. RELATED WORK

Jodhman et al. conducted a study of stroke classification which was classified as three ischemic stroke classes, hemorrhagic stroke and normal through CT Scan image images as a dataset. The steps taken are preprocessing digital images consisting of gray scaling to convert images to gray, scaling to reduce image pixels so that time is efficient. Process the Contrast Limited Adaptive Histogram Equalization (CLAHE) to increase image contrast[5].

Siddique et al. In this study the implementation of segmentation using the Thresholding Otsu method on digital images by setting the threshold for the image in Otsu applied. The Otsu method is carried out to study thresholds that can maximize the variance between classes or the equivalent of making light in the class variance of the entire image. The result of this paper is to compare three types, namely original image, Otsu thresholding level 2 image and Otsu Thresholding level 3 image[6].

Pannirselvam et al. in this paper analyzed various filters and proposed a new methodology for fingerprint pre-processing. In this paper use Bilateral Filters, High boost filters and Gaussian filters for efficient fingerprint image quality. In the proposed methodology, the original is filtered using a High Pass and Gaussian filter to remove noise[7].

Shima et al. this study detected kidney lesions using abdominal CT scans. This paper was conducted for the pre-processing of abdominal CT scan images so that the kidneys were grouped for further analysis of lesion detection. Various noise filters and segmentation techniques have been tried to select the best filters and segmentation techniques for CT image pre-processing. Experimental studies found that the Median filter combination followed by Wiener filter was more effective for removing the different noise present in CT images. Different segmentation techniques have been carried out on CT image test data sets and it was observed that Edge-based active contours yield better results than Graph Cut and region-based active contours[8].

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Race and College Admissions Jamillah Moore,2024-07-22 In the United States elite colleges and universities have historically catered primarily to wealthy predominantly white Americans creating barriers to entry for students of color Legal statutes have entrenched discriminatory practices within the admissions process perpetuating the underrepresentation of students of color at top tier institutions Given this reality the imperative for institutions to promote diversity through affirmative action remains crucial However recent legal challenges against affirmative action threaten to reinforce the status quo potentially perpetuating the dominance of predominantly white institutions in higher education This book takes an historical look at the pivotal role affirmative action has played in higher education It examines the admissions process through the eyes of a beneficiary of affirmative action and is the first text to share insights on the role eligibility plays in allowing universities to consider race in admitting applicants Detailed are the different types of affirmative action and how some colleges and universities use the policy as a tool to consider race and ethnicity as part of a holistic evaluation of applicants This work makes the case that race conscious admissions practices remain necessary in the fight for racial equity in higher education

Strengthening America's Middle Class United States. Congress. House. Committee on Education and Labor,2007

Improving Undergraduate Instruction in Science, Technology, Engineering, and Mathematics National Research Council,Division of Behavioral and Social Sciences and Education,Center for Education,Committee on Undergraduate Science Education,Steering Committee on Criteria and Benchmarks for Increased Learning from Undergraduate STEM Instruction,2003-06-28 Participants in this workshop were asked to explore three related questions 1 how to create measures of undergraduate learning in STEM courses 2 how such measures might be organized into a framework of criteria and benchmarks to assess instruction and 3 how such a framework might be used at the institutional level to assess STEM courses and curricula to promote ongoing improvements The following issues were highlighted Effective science instruction identifies explicit measurable learning objectives Effective teaching assists students in reconciling their incomplete or erroneous preconceptions with new knowledge Instruction that is limited to passive delivery of information requiring memorization of lecture and text contents is likely to be unsuccessful in eliciting desired learning outcomes Models of effective instruction that promote conceptual understanding in students and the ability of the learner to apply knowledge in new situations are available Institutions need better assessment tools for evaluating course design and effective instruction Deans and department chairs often fail to recognize measures they have at their disposal to enhance incentives for improving education Much is still to be learned from research into how to improve instruction in ways that enhance student learning

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Evaluating and Improving Undergraduate Teaching in Science, Technology, Engineering, and Mathematics National Research Council, Division of Behavioral and Social Sciences and Education, Center for Education, Committee on Recognizing, Evaluating, Rewarding, and Developing Excellence in Teaching of Undergraduate Science, Mathematics, Engineering, and Technology, 2003-01-19 Economic academic and social forces are causing undergraduate schools to start a fresh examination of teaching effectiveness Administrators face the complex task of developing equitable predictable ways to evaluate encourage and reward good teaching in science math engineering and technology Evaluating and Improving Undergraduate Teaching in Science Technology Engineering and Mathematics offers a vision for systematic evaluation of teaching practices and academic programs with recommendations to the various stakeholders in higher education about how to achieve change What is good undergraduate teaching This book discusses how to evaluate undergraduate teaching of science mathematics engineering and technology and what characterizes effective teaching in these fields Why has it been difficult for colleges and universities to address the question of teaching effectiveness The committee explores the implications of differences

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INTRODUCTION The role of a Preface is to introduce the nature of the publication The book that emerges from an IFIP Technical Committee World Conference on Computers in Education is complex and this complexity lies in the nature of the event from which it emerges Unlike a number of other major international conferences those organised within the IFIP education community are active events A WCCE is unique among major international conferences for the structure that deliberately ensures that all attendees are active participants in the development of the debate In addition to the major paper presentations and discussion from international authors there are panel sessions and professional working groups who debate particular themes throughout the event There is no doubt that this was not a dry academic conference teachers lecturers and experts policy makers and researchers learners and manufacturers mingled and worked together to explore reflect discuss and plan for the future The added value of this event was that we know that it will have an impact on future practice networks will be formed both virtual and real ideas will change and new ones will emerge Capturing the essence of this event is a challenge this post conference book has three parts The first is the substantial number of theme papers

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