AN IMPROVED FAST SCANNING ALGORITHM BASED ON DISTANCE MEASURE AND THRESHOLD FUNCTION IN REGION IMAGE SEGMENTATION

MASTERS OF SCIENCE (INFORMATION TECHNOLOGY)
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Abstrak


Keywords: Segmentasi imej, Algoritma Pengimbasan Cepat, ukuran jarak, fungsi ambangsuai adaptif, Peak Signal to Noise Ratio.
Abstract

Segmentation is an essential and important process that separates an image into regions that have similar characteristics or features. This will transform the image for a better image analysis and evaluation. An important benefit of segmentation is the identification of region of interest in a particular image. Various algorithms have been proposed for image segmentation and this includes the Fast Scanning algorithm which has been employed on food, sport and medical image segmentation. The clustering process in Fast Scanning algorithm is performed by merging pixels with similar neighbor based on an identified threshold and the use of Euclidean Distance as distance measure. Such an approach leads to a weak reliability and shape matching of the produced segments. Hence, this study proposes an Improved Fast Scanning algorithm that is based on Sorensen distance measure and adaptive threshold function. The proposed adaptive threshold function is based on the grey value in an image’s pixels and variance. The proposed Improved Fast Scanning algorithm is realized on two datasets which contains images of cars and nature. Evaluation is made by calculating the Peak Signal to Noise Ratio (PSNR) for the Improved Fast Scanning and standard Fast Scanning algorithm. Experimental results showed that proposed algorithm produced higher PSNR compared to the standard Fast Scanning. Such a result indicate that the proposed Improved Fast Scanning algorithm is useful in image segmentation and later contribute in identifying region of interesting in pattern recognition.

Keywords: Image segmentation, Fast Scanning algorithm, Distance measure, Adaptive threshold function, Peak Signal to Noise Ratio.
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## List of Abbreviations

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>URG</td>
<td>Unseeded Region Growing</td>
</tr>
<tr>
<td>UUM</td>
<td>Universiti Utara Malaysia</td>
</tr>
<tr>
<td>SRG</td>
<td>Seeded Region Growing</td>
</tr>
<tr>
<td>SAR</td>
<td>Synthetic Aperture Radar</td>
</tr>
<tr>
<td>LOG</td>
<td>Laplacian of Gaussian</td>
</tr>
<tr>
<td>1 D</td>
<td>One Dimensions</td>
</tr>
<tr>
<td>2 D</td>
<td>Two Dimensions</td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
</tr>
<tr>
<td>OCR</td>
<td>Optical Character Recognition</td>
</tr>
<tr>
<td>RGB</td>
<td>Red, Green and Blue</td>
</tr>
<tr>
<td>IDE</td>
<td>Integrated Development Environment</td>
</tr>
<tr>
<td>ROC</td>
<td>Receiver operating characteristic</td>
</tr>
<tr>
<td>SEM</td>
<td>Structural Equation Model</td>
</tr>
<tr>
<td>PSNR</td>
<td>Peak Signal to Noise Ratio</td>
</tr>
<tr>
<td>MAE</td>
<td>Mean Absolute Error</td>
</tr>
<tr>
<td>GCE</td>
<td>Global Consistency Error</td>
</tr>
<tr>
<td>RI</td>
<td>Rand Index</td>
</tr>
<tr>
<td>VoI</td>
<td>Variation of Information</td>
</tr>
<tr>
<td>PRM</td>
<td>Precision Recall Measure</td>
</tr>
<tr>
<td>BDE</td>
<td>Boundary Displacement Error</td>
</tr>
<tr>
<td>LCE</td>
<td>Local Consistency Error</td>
</tr>
<tr>
<td>PSO</td>
<td>Particle Swarm Optimization</td>
</tr>
<tr>
<td>MAP-ML</td>
<td>Maximum and Posterior Maximum Likelihood</td>
</tr>
<tr>
<td>JPEG</td>
<td>Joint Photograph Experts Group</td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

1.1 Background

There has been a substantial increase in the attention given to the challenges brought by image processing throughout the last twenty years. This attention has generated a growing demand for theoretical approaches as well as application of computer hardware with appropriate software in the design of image processing systems (Wang, 2010).

Image segmentation is one of the basic steps of the image processing and machine vision. It segments images for accurate boundaries that transform the image’s representation for detail (Tawfeeq & Tabra, 2014). Its key point is: the image is divided into a number of sets that do not mutual overlapping zones; these zones either have meaning to currently mission or help to explain correspondence between them and the actual object or some parts of object (Lakshmi, 2010). Therefore, it is a process in which divide the image into disjoint regions that are meaningful with feature section and removes that relevant objects.

Image segmentation is a very interesting area in image processing field due to images are one of the most important medium to convey information in the field of computer vision (Wang, Guo, & Zhu, 2007). Yet, verifying the segment boundaries automatically remains a big challenge. Image segmentation have a wide range of applications in practice, such as: industry automation, product online detection, manufacturing and process control, remote sensing image processing, biomedical image analysis, etc (Agrawal, 2014).
The contents of the thesis is for internal user only
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