

A New Global Thresholding Approach for Document Image Binarization

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Document image binarization is an active research area in the field of image processing. The work reported here, proposes a new methodology for determination of the threshold value to binarize noisy/noise free digitized document images. Firstly, Middle of Modal Class (MMC) filtering technique is applied on the digitized document images for smoothing the noisy pixels. Then, from that information, two sets of gray-level values, one obviously representing objects and another obviously representing background, are identified. Rest of the gray-level values has been left for calculation of the threshold value. After that, the mean gray-level value of all these pixels with gray-levels of the third set, which will finally be used as threshold for binarization, is determined. A post-processing technique is also suggested here to remove unwanted spots in the foreground and background regions. A comparison of proposed technique with iterative thresholding and Otsus thresholding methods have been done, and it is evident from the output images that proposed methodology provides better result.

Keywords: Binarization Technique, Global Thresholding, Handwritten Document Image, MMC Filtering, Noisy/Noise Free Document Image.

1. INTRODUCTION

Image processing has its wide application in various fields of computerized systems like satellite image processing, medical image analysis, security related biometric applications (like face, fingerprint, iris analysis *etc.*), archiving of old document or manuscript images, etc. As a result, research interest in the field of image processing has been growing fast during the past few decades. The key modules of image processing system are image acquisition, enhancement, segmentation and analysis. Out of these, image enhancement technique,

which includes removal of noise, tuning of contrast or binarization, is essential for preprocessing of acquired digitized images for almost every application domain of image processing.

Optical Character Recognition (OCR), a sub field of image processing and pattern recognition, is a challenge to the researchers from long time before [1]. There are several issues in developing an OCR system. One such issue is related to the enhancement of acquired document images which may be of poor quality due to low quality original document (e.g., old blue-prints, *etc.*), quantization errors in dig-

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