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Text Image Deblurring via Two-Tone Prior

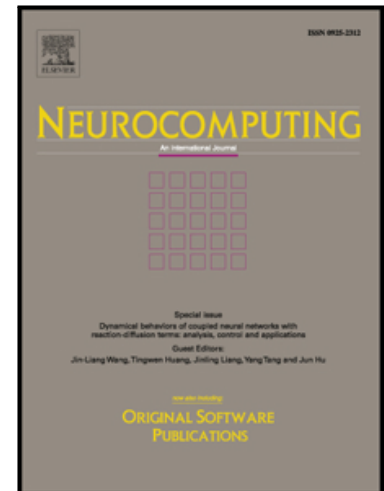
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# Text Image Deblurring via Two-Tone Prior

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## Abstract

General natural image deblurring methods do not work well for document images. We exploit a two-tone prior to steer the intermediate latent image towards a piece-wise constant two-tone intermediate image. This prior is helpful for the process of kernel estimation to overcome undesirable local minima, and it is not too restrictive to deblur text images with complex backgrounds. Our kernel estimation method comprises two stages, where we first employ contrast-enhancing two-tone prior and then use intermediate-value inhibition regularizer. The resulting optimization formulation is solved by half-quadratic splitting and alternating minimization techniques. The experimental results show that the proposed method is capable of achieving accurate results and compares well with the state-of-the-art.

*Keywords:* blind deconvolution, text images, binary images

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## 1. Introduction

Text is perhaps one of the most typical man-made patterns, and text (or document) images make up a significant category of general photographs. With the wide availability of consumer electronics, we can easily take a picture of a poster, a notice, or a merchandise tag for latter perusal. However, camera shake may greatly degrade the visual quality of a text image and it may cause eyestrain for people to identify blurry characters if at all possible, thus deblurring for text images is at least as important as for natural images. Because text images have some distinctive properties, methods for natural image deblurring are less effective when applied directly to text images [1, 2]. The main concern when viewing a document image is to identify characters, as is different for natural-scene images. To aid

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