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An Alternating Proximal Approach for Blind Video Deconvolution

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Abstract

Blurring occurs frequently in video sequences captured by consumer devices, as a result of various factors such as lens aberrations, defocus, relative camera-scene motion, and camera shake. When it comes to the contents of archive documents such as old films and television shows, the degradations are even more serious due to several physical phenomena happening during the sensing, transmission, recording, and storing processes. We propose in this paper a versatile formulation of blind video deconvolution problems that seeks to estimate both the sharp unknown video sequence and the underlying blur kernel from an observed video. This inverse problem is *ill-posed*, and an appropriate solution can be obtained by modeling it as a nonconvex minimization problem. We provide a novel iterative algorithm to solve it, grounded on the use of recent advances in convex and nonconvex optimization techniques, and having the ability of including numerous well-known regularization strategies.

Keywords: Blind deconvolution, video processing, regularization, nonconvex optimization, proximal algorithms

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