Abstract

Blurring is a common artifact that produces distorted images with unavoidable information loss. The Blind image deconvolution is to recover the sharp estimate of a given blurry image when the blur kernel is unknown. Despite the availability of deconvolution methods, it is still uncertain how to regularize the blur kernel in an effectual fashion which could substantially improve the results even when the image is blurred to its extend. This paper presents a novel deconvolution method that describes an efficient optimization scheme that alternates between estimation of blur kernel and restoration of sharp image until convergence. The system engenders a more efficient regularizer for the blur kernel that can generally and considerably benefit the solution for the problem of blind deconvolution. Also the blur metric concept in the system provides an automated environment for the selection of deconvolutoin parameters. The outlier handling model used in this work detects and eliminates the major causes of visual artifacts. As a result the system produces high quality deblurred results that preserves fine edge details of an image and complex image structures, while avoiding visual artifacts. The experiments on realistic images show that the proposed deconvolution method can produce high quality deblurred
images with very little ringing artifacts even when the image is severely blurred, and the ability of system in choosing the appropriate input parameters for deconvolution.

References


Index Terms

Computer Science  Image Processing

Keywords
Image deblurring, blind deconvolution, blur kernel estimation, point spread function, spectral methods, outlier detection, blur metric.