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## Variational Bayesian Approach to Multiframe Image Restoration

### Abstract:

Image restoration is a fundamental problem in the field of image processing. The key objective of image restoration is to recover clean images from images degraded by noise and blur. Recently, a family of new statistical techniques called variational Bayes (VB) has been introduced to image restoration, which enables us to automatically tune parameters that control restoration. While information from one image is often insufficient for high-quality restoration, however, current state-of-the-art methods of image restoration via VB approaches use only a single-degraded image to recover a clean image. In this paper, we propose a novel method of multiframe image restoration via a VB approach, which can achieve higher image quality while tuning parameters automatically. Given multiple degraded images, this method jointly estimates a clean image and other parameters, including an image warping parameter introduced for the use of multiple images, through Bayesian inference that we enable by making full use of VB techniques. Through various experiments, we demonstrate the effectiveness of our multiframe method by comparing it with single-frame one, and also show the advantages of our VB approach over non-VB approaches.