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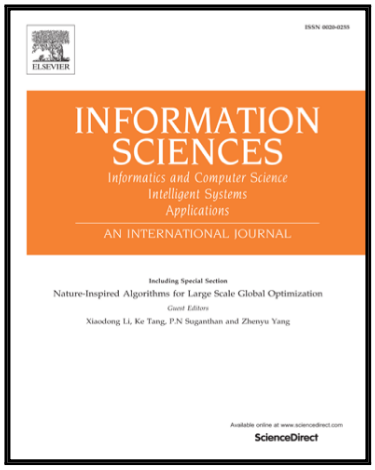

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Removing Moiré Patterns from Single Images

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Abstract

Interference between the grids of the camera sensor and the screen cause moiré patterns to always appear on photographs captured from a screen, significantly affecting people's ability to review images. We propose a novel method to remove such a screen moiré pattern from a single image. We characterize the degraded image as a composition of two layers: the latent layer and the moiré pattern layer. Because the screen moiré pattern is global and content-independent, we regard it as a group of sublayers, and we find that each sublayer after the shear transformation has a low-rank property. Combined with the piecewise constant feature of the latent layer, a convex model is proposed to solve the demoiréing problem. Experiments on synthetic and real data demonstrate its feasibility and efficiency.

Keywords: Moiré pattern, Shear nuclear norm, Low rank, Convex optimization

1. Introduction

In physics, a moiré pattern is a kind of large-scale interference pattern that can be produced by superimposing two sets of repetitive gratings [28]. For the moiré interference pattern to appear, the two gratings must not be completely identical but must differ in sizes, angles, or spacing (see Figure 1). There are many kinds of moiré patterns in real life, such as those arising from stripes in clothing or architecture. One of the most common moiré pattern occurs when

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