

Textured Image Demoiréing via Signal Decomposition and Guided Filtering

Abstract:

Moiré artifacts are generally caused by the interference between the overlap of the sensor's sampling grid and high-frequency (nearly) periodic textures, and heavily affect the image quality. However, it is difficult to effectively remove moiré artifacts from textured images as the structure of moiré patterns is similar to that of textures in some sense. In this paper, we propose a novel textured image demoiréing method by signal decomposition and guided filtering. Given a textured image with moiré artifacts, we first remove moiré artifacts in the green (G) channel using the proposed low-rank and sparse matrix decomposition model. This model regularizes the texture layer by the low-rank prior in spatial domain and the moiré layer by sparse representation in frequency domain. An alternating direction method under the augmented Lagrangian multiplier framework is used to solve the matrix decomposition model. Then, since the red (R) and blue (B) channels are more heavily polluted by moiré artifacts than the G channel, we propose to remove moiré artifacts in its R and B channels via guided filtering by the obtained texture layer of the G channel. Experimental results demonstrate that our method outperforms the state-of-the-art methods for both synthetic and real images.