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Although several subjective and objective quality assessment methods have been proposed in the literature for images and videos from single cameras, no comparable effort has been devoted to the quality assessment of multicamera images. With the increasing popularity of multiview applications, quality assessment of multicamera images and videos is becoming fundamental to the development of these applications. Image quality is affected by several factors, such as camera configuration, number of cameras, and the calibration process. In order to develop an objective metric specifically designed for multicamera systems, we identified and quantified two types of visual distortions in multicamera images: photometric distortions and geometric distortions. The relative distortion between individual camera scenes is a major factor in determining the overall perceived quality. In this paper, we show that such distortions can be translated into luminance, contrast, spatial motion, and edge-based structure components. We propose three different indices that can quantify these components. We provide examples to demonstrate the correlation among these components and the corresponding indices. Then, we combine these indices into one multicamera image quality measure (MIQM). Results and comparisons with other measures, such as peak signal-to noise ratio, mean structural similarity, and visual information fidelity show that MIQM outperforms other measures in capturing the perceptual fidelity of multicamera images. Finally, we verify the results against subjective evaluation.

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