Evaluating Image Quality in Fisheye Lens Captures through Zernike Polynomial and MTF Analysis

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Fisheye lenses produce images with unique characteristics and varying degrees of distortion, posing challenges in image quality evaluation. This study proposes an analysis of image distortion in fisheye lens captures by employing Zernike polynomials, a method that effectively characterizes optical aberrations. The results are then compared to traditional Modulation Transfer Function (MTF) evaluation to provide a comprehensive assessment of image quality. By contrasting Zernike-based aberration analysis with MTF-based evaluations, this approach aims to enhance the understanding of fisheye lens performance and establish a more detailed framework for quality assessment of such wide-angle optical systems.

Short biography:

Manning Sun received the B.S. degree in Applied Physics from the Huaiyin Normal University, Jiangsu, China , in 2018, and the M.S. degree in Optical Engineering from Utsunomiya University, Tochigi, Japan, in 2024, where she is currently pursuing the Ph.D. degree in Optical Science and Engineering.Her research interests include unconventional optical system, optics, image processing, and MTF.