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Image quality assessment methods for near-infrared wildfire imagery

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Abstract

Over the past two decades, there has been a surge of interest in the study of image quality assessment due to its broad applicability in many fields. Satellites and other remote sensing applications have been collecting vital data that is utilised to monitor targets or events in varying environmental conditions all over the world. Some of these collections include images of natural disasters and anthropogenic events such as wildfires, floods, and drought, among others. However, appropriate image quality assessment techniques have been lacking for image fusion and other remote sensing applications where the information is not targeting the human visual system. Currently, there are several perceptual image quality assessment methods that can be applied depending on the image sensor type. In this paper, we focus on various no-reference general and specific image quality methods that can be used to evaluate remote sensing images for fire detection. Further, we evaluate the effectiveness of the non-referential image quality techniques applied in the processing of airborne sensor images, notably those for fire detection, and correlate the effectiveness of these techniques to the accuracy of detection. In this paper Image quality assessment (IQA) methods such as entropy, BRISQUE, MUSIQ, exposure, and CPBD are analyzed along with methods for image distortion, i.e., Gaussian blur, and image enhancement such as HE, AHE, and CLAHE. Therefore, the no-reference image quality assessment investigation will contribute to the detection and correction of image quality processing issues in wildfires.