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Considerations for a simplified temperature calibration procedure for infrared cameras

Chirindo, Mathews; Molekoa, Malinkeng M

Abstract

Temperature calibration of infrared cameras is vital to ensure precise and accurate measurements amidst natural drift due to ageing and other environmental factors. However, conventional calibration is simultaneously constrained by multiple camera settings, such as gain and integration time, in addition to other factors such as emissivity and distance of the object, which impact the pixel value on which the temperature measurement is based. Different sets of camera settings usually require specific calibration tables, leading to a cumbersome calibration process, high computational burden, and huge storage requirements. This paper proposes a simplified temperature calibration process for infrared cameras that allows accurate temperature measurements despite camera settings, using linear regression, interpolation, and curve fitting techniques. Experimental results are presented to demonstrate the successful calibration of two infrared detectors, despite camera settings at an accuracy of 1.9 ° C compared to a calibrated pyrometer. The sensitivity analysis of the two infrared detectors is provided.