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The application of machine learning based on OpenCV for automatic digital dial gauge calibration

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The traditional method of dial gauge calibration is time consuming and a measurement result is depending highly on human errors. To overcome this problem, an automatic measuring system based on machine vision has been proposed. This paper presents an application of machine learning based on Open CV for automatic digital dial gauge calibration. The k-Nearest Neighbors algorithm is applied for characters recognition of the dial gauge panel. The dial gauge tester developed in this study has a calibration and measurement capability (CMC) of approximately 0.0012mm. Even though the image of a dial gauge reading is slightly disturbed due to reflected light, the algorithm indicates efficient characters recognition of dial gauge reading. In this study, a calibration result from the developed method and traditional method were compared using a commercial digital dial gauge with a measuring range of 10 mm. The result shows good agreement with a comparable measurement uncertainty, approximately 0.008 mm. The automatic calibration system, however, has many great advantages over the traditional method as the algorithm can eliminate most human errors and also can reduce measurement time by 70%.

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