

# Application of Computer Vision and Laser Interferometer to Two-dimensional Inspection

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## Abstract

In the paper laser interferometer, vision system and a two-dimensional precision translation stage are used to develop a high precision measuring station with a working range of  $18 \times 18$  mm. The vision system is installed at the Z-axis of a coordinate measuring machine (CMM), and the laser, the split and reflection mirrors, and the X-Y stage are mounted on the platform of the CMM. The object inspected by the laser-and-vision system is moved using an X-Y table so that the camera can take the images of the feature points (such as corners) of the object at two different positions. Meanwhile, the displacement of the X-Y table is measured using laser interferometer. Putting these two feature points in one image, the distance between them can be evaluated under the image plane coordinate system. By adding the displacement measured by laser interferometer, the real distance between these two feature points is obtained. The developed two-dimensional laser-and-vision measuring system is used to measure the geometric size of several Olympus specimens. Experimental results indicate that the measured values are in good agreement with the Olympus measurements

Keyword : computer vision, laser interferometer, subpixel edge detection, vision inspection system