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Homogeneous surface metrology using structured fringe projection

Abstract

Automated visual inspection (AVI) systems are playing important roles in quality inspection within the electronic industry. Most existing AVIs are single overhead cameras. Such systems are incapable of detecting 3D surface defects. This paper proposes to solve this shortcoming using an angled fringe projection. Within this context, existing implementations use multiple images of shifted fringe patterns and then apply phase unwrapping techniques to obtain the phase angle which is then used to compute the height. In our work, we use a single captured image and a direct triangulation technique. With proper image processing, this method can be applied to homogeneous surfaces after proper calibration. Our work demonstrates the successful manipulation and calibration of a non-collimated light source for height measurement.

Keywords — Automated Visual Inspection (AVI), fringe projection, non-collimated lighting.