

Nondestructive Method of Automatic PCBs Visual Inspection in High Volume Production, Based on Multiple Sensors Data

Piotr Szablata, Pawel Lakowski
PhD Student at Poznan University Technology
Piotr.Szablata@doctorate.put.poznan.pl,
Pawel.Lakowski@doctorate.put.poznan.pl

Janusz Pochmara
Poznan University of Technology, Chair of Computer Engineering
Janusz.Pochmara@put.poznan.pl

Abstract

High production standards for electronic devices are enforcing frequent quality checks at different productions steps. Usually such controls are covered by expensive AOI machines or manual visual inspections [1]. Late progress in vision technologies made it possible to create another solution – system, which uses combination of multiple capturing devices, depth sensors and light sources to generate image reconstruction, filled with data precise enough to perform complex inspection calculations. With computer application written specifically for this purpose it is possible to achieve results comparable with advanced solutions available on the market. It is aided with different color lightings, activated automatically by the software, depending on average pallet found on product. Main calculations are made on computer running dedicated application. Two data streams with 16.67ms lag between frames are the minimum inputs needed to start inspection. Both streams, RGB and depth, are working with the same frequency. This synchronization is the key in reaching fast and precise calculations. Software uses different algorithms and filters to detect shapes, familiar patterns, color changes, gradients, pixel weights and many other variables used for validation [3]. Innovation in comparison with expensive AOI machines, lies with usage of depth sensors, which are working as separate stream of data that can completely change final result. Clear advantage of this project is its open construction. It is possible to easily change layout of sensors and learn new patterns to achieve different ways of implementation. This station can be used not only on production lines but also in small labs and classrooms. Software can be used to search for small components, color variations, height changes. It is also possible to run live control with modifiable alarms activated whenever result reaches any of the specified limits.

References

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