



Creating a 'Poka-Yoke' world

Machine vision technology cuts down installation and maintenance time of 'zero defects' systems

'Poka-Yoke' techniques are now widely prevalent amongst manufacturers all over the world and across industry verticals. While majority of 'Poka-Yoke' systems are based on basic mechanical jigs and fixtures, there is increasing popularity for more versatile and instantly reconfigurable machine vision based 'Poka-Yoke' systems. Dr Ganesh Devaraj, Ajay Varma.

In the early 1960s quality guru Shigeo Shingo combined the concepts of 'successive', 'independent' and 'source' inspections with Toyota's in-house 'fool-proofing' techniques and devised the famous production philosophy 'Poka-Yoke' (POH-kah YOH-keh), a tool to achieve and sustain 'zero defects'. It implies absolute elimination of defects in the production process. Defect free supplies are not just a desired goal, but in many instances essential for suppliers. In many cases a single defect has been found to be the cause of outright rejection of the entire batch or 100 per cent manual re-inspection of every component in the batch at the expense of the supplier.

Having realised the importance of globalisation, Indian manufacturers understand the significance of providing quality consistently in order to retain and enhance business. Hence, in order to eliminate manual errors, automation is gaining popularity in quality control and inspection processes.

The traditional approach to automation in quality control was to replace End-of Line (EoL) manual inspection with an automated inspection system. There are many disadvantages to this approach, but until recently due to high cost of machine vision based inspection systems, there were no other alternatives. The recent introduction of machine vision based low-cost 'Poka-Yoke' products, however, has brought a revolution.

EoL inspection Vs 'Poka-Yoke'

EoL systems are installed at the end of production and assembly lines are used as a final comprehensive test of multiple critical product parameters before the batch is shipped to the customer or transferred to the next production cell. These systems are inevitably large, complex and expensive. The variety of tests to be performed, adds to the complexity, cost of the system, and time, and effort involved in its development,

installation, and validation. On the other hand, 'Vision based Poka-Yoke' products, are small, low-cost, simple, and are directly integrated into various stages of the production line.

Vision-based 'Poka-Yoke'

The specific benefits of 'Poka-Yoke' approach infused interest regarding the design of such simple inspection systems. Soliton's 'Spot-It' was specifically designed using powerful tools of machine vision. The Indian scenario warranted a unique approach to machine vision. As a result a new product was designed for automation engineers who had no prior experience in machine vision. With the new design, training time as low as two days and installation time of less than one week are now a reality!

Spots defects

The smart camera (Spot-It) is easy to use and customers had even designed and installed the systems themselves, after just a basic training! In order to attain seamless integration into systems, 'Spot-It' is designed to interface with leading industry PLCs like Allen Bradley, GE Fanuc, Siemens, etc, as well as industry-standard controllers, robots and computers via RS232 and digital I/Os.

Although the nature of inspection and the industry served varies widely among applications, the single common factor in all cases is that the defect can be identified visually. Comparative studies show that 'Vision based Poka-Yoke' devices like the 'Spot-It' have clear advantages over other systems in particular applications where production or assembly lines have to be fool-proofed against defects like, parts mix-up, missing parts, misalignment, missed operations and wrong assembly.

Industry spots it!

Industry leaders like Bajaj, Delphi-TVS, Gabriel, Igarashi, Mahindra, MICO, and Pricol have already indicated their approval of this new technology with multiple orders being placed for the 'Spot-It'.

Machine vision products

Soliton developed a range of products for the Indian market including machine vision cameras, specialised LED lighting, smart cameras, and standalone vision systems. With the availability of high quality machine vision components and technical support domestically, automation solution providers would finally have competitive edge over imported inspection machines that currently dominate the market.

Go Vision! Go Poka-Yoke!

Inevitably Indian manufacturers would increasingly demand more and more automation to ensure quality at six-sigma and zero-defect quality levels. 'Machine vision based Poka-Yoke' proves to be the most cost effective way to address this need. With its reduced complexity and increased performance, this would be the optimal way to meet increasingly stringent quality standards of the industry without the need for teams of highly qualified and expensive vision experts and consultants.