

Automatic Adjustment of Thresholds via Closed-Loop Feedback Mechanism for Solder Paste Inspection

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Abstract : Surface Mount Technology (SMT) is widely used in the area of the electronic assembly in which the electronic components are mounted to the surface of the printed circuit board (PCB). Most of the defects in the SMT process are mainly related to the quality of solder paste printing. These defects lead to considerable manufacturing costs in the electronics assembly industry. Therefore, the solder paste inspection (SPI) machine for controlling and monitoring the amount of solder paste printing has become an important part of the production process. So far, the setting of the SPI threshold is based on statistical analysis and experts' experiences to determine the appropriate threshold settings. Because the production data are not normal distribution and there are various variations in the production processes, defects related to solder paste printing still occur. In order to solve this problem, this paper proposes an online machine learning algorithm, called the automatic threshold adjustment (ATA) algorithm, and closed-loop architecture in the SMT process to determine the best threshold settings. Simulation experiments prove that our proposed threshold settings improve the accuracy from 99.85% to 100%.

Keywords : big data analytics, Industry 4.0, SPI threshold setting, surface mount technology

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