Automatic Optical Inspection of the SMD Power Inductor Using Color-Texture Recognition

E-mail: 9511044@ mail.dyu.edu.tw

ABSTRACT

This research develops an image process system to inspect defects of power inductors, including copper wire broken, iron core broken and copper wire leak. The image process techniques are divided into two parts: copper color recognition and texture recognition. For copper color recognition, we use color space transformation to reduce a lighting disturbance. Next, we get training data composed of copper colors and not copper colors from different regions of power inductors. The least square method and neural network system are used to obtain the best color axis of the copper color, respectively. Thus, we find positions of copper wire on the power inductor based on this color axis. For texture recognition, we use the wavelet transformation to obtain four regions of the power inductor: low frequency, high frequency, horizontal edge and vertical edge. The high frequency region is employed to find positions of iron core broken, copper wire leak and wire broken. Those positions compare with positions of copper wire to confirm the defect types of the power inductor. Finally, the proposed method is applied to a practical production of the power inductor. Results show that the successful recognition of defects is more than 98%. Key Words: Wavelet transformation, Color segmentation, Power inductor, Machine vision, Neural network system

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