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[54] AI-BASED FAILURE MECHANISM PREDICTION SYSTEM AND METHOD FOR PCB SOLDER JOINTS
基於人工智能的印刷電路板焊點失效機制預測系統及方法

[57] The present invention discloses a printed circuit board (PCB) soldering failure mechanism prediction system and method based on artificial intelligence (AI). The system (1000) comprises: a camera-based PCB soldering region detection module (1002) comprises a PCB defect classification model; a thermal imaging camera-based detection module (302) for PCB soldering failure mechanisms

under high current usage; and a PCB failure mechanism prediction module (1004). The camera-based PCB soldering region detection module (1002) and the PCB failure mechanism prediction module (1004) utilize deep learning models to identify PCB solder joints, classify defects, and predict failure mechanisms. The thermal imaging camera-based detection module (302) performs experiments to provide information for training the PCB failure mechanism prediction module (1004).

本發明公開了一種基於人工智能（AI）的印刷電路板（PCB）焊點失效機制預測系統及方法。該系統（1000）包括：基於攝影機的 PCB 焊接區域偵測模組（1002），包括 PCB 缺陷分類模型；基於熱成像相機的偵測模組（302），用於偵測高電流使用下的 PCB 焊接故障機制；以及 PCB 失效機制預測模組（1004）。基於攝影機的 PCB 焊接區域偵測模組（1002）及 PCB 失效機制預測模組（1004）利用深度學習模型來識別 PCB 焊點、對缺陷進行分類並預測失效機制。基於熱成像相機的偵測模組（302）進行實驗，為訓練 PCB 失效機制預測模組（1004）提供資訊。

1000

Inference Results

1004

PCB failure mechanism prediction module

1002

PCB soldering region detection module

RGB Image Capture System