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Abstract Printed circuit boards (PCBs) are extensively used in diverse electronic products today. The placement process is

generally the bottleneck in a PCB assembly line. Many related researches on SMT PCB assembly usually focus on the

improvement of process perspective of placement machine operations. However, there is rarely any research on the calibration

process of placement head of SMT placement machine. The research mainly applies the data mining model to analyze the effect

of a head calibration process to placement defects in a PCB assembly line. The analysis is able to generate a set of values for

head calibration. This will in turns reduces the component placement defects caused by inappropriate calibration process. Based

on the data collected from assembly line, this research firstly uses a Regression Analysis Method to predict the total defects

caused by the placement heads of the machine. The process is able to predict the defects of single Placement head. Moreover,

the Back-Propagation Network (BPN) is used as a framework for parameter training. The development of BPN could predict

the placement defects caused by each placement head of the machine. Meanwhile, the placement

head with high defect number

is selected to further perform a sensitivity analysis. Based on the result of the analysis, the individual parameter calibration of the

head is performed again to reduce the expected defects and increase the production efficiency. The developed analytical model

can assist engineers to perform the calibration process of placement head in a PCB assembly line. In turns, it reduces the defect

in placement operation so as to improve the productivity.
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