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PROPOSAL FOR QUANTITATIVE EVALUATION METHOD OF THE COMPLEXITY OF INSPECTION SURFACE IN APPEARANCE INSPECTION

Abstract:

To assume the appearance quality of industrial products, appearance inspection is conducted by humans in numerous manufacturing industries. Previous studies have proposed appearance inspection method utilizing peripheral vision, and the effectiveness of the inspection method has been verified in the case of simple inspection surfaces. However, it is unclear whether the method can be applied for complex inspection surfaces. Although a previous study assumed the complexity of inspection of surfaces sensuously, a quantitative evaluation method of inspection surfaces is required. This study considers such an evaluation method and applies it on the actual products. Specifically, the evaluation method uses definitions with two indexes: color complexity and structure/shape complexity. The former uses information entropy, which is an index indicating the uncertainty of each item. It is defined by $H = -\sum_{i=1}^n p(i) \log p(i)$ and takes values from 0 to 8. The latter uses the fractal dimension, which is an index considering expansion of the phase dimension. It is defined by $-D = (\log N(a) / \log a) - C$ and takes values from 0 to 2. Furthermore, the complexity of the inspection surface is evaluated using various pictures captured by manufacturers.

Keywords:

appearance inspection, complexity of inspection surface, defect detection

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