

Development of Tablet Defect Detection Model Using Biaxial Planes Discrete Scanning Algorithm

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Abstract

Oral administration is the most broadly used dosage form for drug delivery in a disease treatment. However, the tablet imperfections known as visual defects may significantly impact the efficacy and therapeutic effect. Accordingly, the tablet defect identified before bottling is a crucial issue in the pharmaceutical industry. Presently, the defect checking usually relies on either manual sampling, visual image processing or combination of deep learning methods in the manufactory. Nevertheless, currently it still lacks both simple and effective mechanism to tackle this problem in industry. For this reason, the tablet defect detection model is developed using a biaxial planes discrete scanning algorithm based on simple algebraic calculation. Therefore, actual tablet shape can be quickly identified, and the defect status can be thus evaluated accurately. Initially, the standard tablet shape is formed using biaxial planes discrete scanning process from both front and side views respectively. Second, analog output signal generated from the image sensor is transformed into a series digital code in an array. Third, every tablet for investigation is processed following up the same steps as the standard tablet does. Finally, the defect status is determined using similarity gap and square mean error (SME) between the standard tablet and detected one. The experimental results reveals that the defect tablet has a significantly big similarity gap over the standard one up to 20% and 100% in front and side views, respectively. On the other hand, the square mean error (MSE) reaches 7903 and 5393 in front and side views, respectively. It verifies that the proposed model can effectively justify the defect status in term of rapidness, accuracy and robustness.

Biography

Hsiung-Cheng Lin graduated from National Taiwan Normal University for his bachelor degree in 1986, Taiwan. He received Master and PhD degree from Swinburne University of Technology, Australia, in 1995 and 2002 respectively. Between 2011 to 2021, he received a special talent reward from the National Science Council, Taiwan. Also, he was honored as World's Top 2% Scientists 2020- Lifetime scientific influence leaderboard (1960-2020) (Scopus). He has been working as guest editors in international journals such as Applied Sciences, Sensors, Algorithms, Journal of Robotics, Sensors & materials, etc. He is currently a tenured distinguished professor in the Department of Electronic Engineering at National Chin-Yi University of Technology, Taiwan. His special fields of interest include system integration, automatic measurement, signal processing and analysis, power electronics, and neural network, etc.