



AUTOMATED PRODUCT DEFECT DETECTION

**UNDERGRADUATE THESIS
Submitted as one of the requirements to
obtain Sarjana Komputer**

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ABSTRACT

Product defect detection is a significant step in production lines of industries traditionally relying on human manual inspection which is wasteful of labor, prone to errors, and non-productive, especially with increasing production levels. Such shortcomings can lead to defective products reaching consumers, resulting in dissatisfaction, threat to safety, and loss of reputation for manufacturers and cost loss through reworks or recalls. To address these problems, this capstone project is going to develop an automated system of fault detection through computer vision and deep learning procedures for the enhancement of industrial product quality assurance.

We employ the use of advanced Convolutional Neural Networks (CNNs), i.e., leveraging existing models like HRNet under the Anomalib library, having the capability to successfully detect various faults like scratches, open faults, stains, etc. This system should capture images of products along the line of production and process them in real-time with instant feedback to operators to enable timely correction. The system also possesses capabilities of data logging and reporting, summing up data regarding detected defects, their time stamps, and types, which could be represented through interactive dashboards for trend analysis and continuous process improvement.

The findings are that a CNN-based approach offers significant advantages over traditional manual inspection by offering a robust, scalable, and effective automated defect identification. By automating this critical quality control process, our system mitigates human error, significantly reduces labor costs, and contributes to improved product quality and improved manufacturing efficiency, ultimately towards improved customer satisfaction and manufacturer confidence. This project recognize the growth potential of AI and computer

vision in revolutionizing manufacturing quality control processes.

Keywords: automated defect detection, computer vision, deep learning, quality control, real-time detection, anomalib, hrnet, convolutional neural networks.

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