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Systematic Review: Artificial Intelligence-Based Methods for Quality Control and Defect Analysis in the Apparel Industry

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Abstract

Nowadays, garment manufacturing companies face increased worldwide competitiveness and unpredictable demand variations. These demands push companies to continually enhance the effectiveness of their manufacturing processes to provide the final product in the shortest possible time and at the lowest possible cost. Traditional manual approaches, on the other hand, confront limitations in terms of subjectivity, time limits, and scalability, driving the study to propose ideal AI-based methods for garment quality inspection. This systematic study looks into the integration of artificial intelligence (AI) technologies such as Convolutional Neural Networks (CNNs), Artificial Neural Networks (ANNs), and many more AI technologies for quality control and defect detection in the clothing industry's sewing segment. This focuses on innovations such as CNNs for identifying damaged stitches and the influence of ANN on the fashion supply chain. Future work recommendations include broadening AI-powered defect detection, incorporating AI into Industry 4.0, resolving ethical problems, and developing adaptive AI systems to handle dynamic changes in garment patterns. Overall, this analysis sheds light on the revolutionary potential of CNNs and ANNs in improving quality control in the clothing industry's sewing division.

Keywords: *Apparel industry, Artificial intelligence, Quality control, Defect analysis, Artificial intelligence*