Abstract

The exploration of fabric quality identification leverages machine learning (ML) techniques to enhance the assessment process. The benefits of ML in automating and optimizing fabric evaluation are discussed, focusing on attributes such as tensile strength, weave consistency, and defect detection. A combination of supervised learning for initial pattern recognition, unsupervised learning for anomaly detection, and semi-supervised learning to leverage both labeled and unlabeled data is recommended. Additionally, convolutional neural networks (CNNs) are highly effective for analyzing fabric images, while integrating sensor data enhances the overall accuracy of the models. The integration of sensor data, preprocessing, and model validation is emphasized to ensure accuracy. Challenges such as data scarcity and model interpretability are addressed, with proposed solutions to mitigate these issues. Future directions involve the adoption of multimodal approaches and fostering collaboration between textile experts and ML practitioners. This collaboration aims to tailor algorithms to meet industry needs, driving innovation in fabric quality assessment.