

# Improved Fabric Defect Detection Using a Vision Transformer and ResNet Hybrid Model

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**Abstract:** Fabric defect detection plays a vital role in ensuring the production of high-quality textiles. Manual inspection methods are time-consuming, subjective, and error-prone, necessitating the development of automated systems. This research paper proposes a novel approach to fabric defect detection by combining the strengths of Vision Transformer (ViT) and ResNet-50 architectures into a hybrid model. A notch filter coupled with a fast Fourier transform is also used to improve the quality of the training dataset. The hybrid model aims to capture both local and global information within fabric images, thereby enhancing defect detection accuracy. Extensive experiments on a publicly available fabric defect dataset demonstrate that the proposed hybrid model outperforms the individual ViT and ResNet-50 models and other state-of-the-art fabric defect detection approaches. The results showcase a superior accuracy of 98.5% for our proposed architecture, which is significantly higher than the 93.4% and 96.5% achieved by ResNet and ViT, respectively.

**Keywords:** Fabric defect, Machine Learning, ResNet-50, Vision Transformer, Hybrid Model.

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