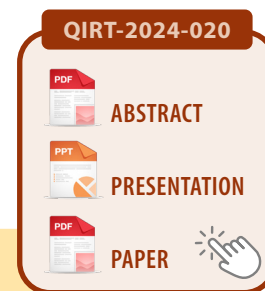




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THREE-DIMENSIONAL CONVOLUTION ASSISTED THERMAL IMAGE GENERATION FOR DEFECT DETECTION IN COMPOSITE MATERIALS

A defect detection method utilizing three-dimensional (3D) convolutional augmentation has been proposed for the infrared thermographic analysis of composite materials. This method is inspired by the concept of generative adversarial networks, employing a 3D convolutional autoencoder for data reconstruction in the generation phase, with a discriminator added to guide the generator in the iterative pro-

duction of thermal image samples. Subsequently, principal component analysis is utilized for the extraction of defect features from the amalgamated data, which includes both measured and generated thermograms, thereby enhancing the defect detection performance. The effectiveness of this proposed method is evidenced by the test results obtained from carbon fibre reinforced polymers.