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CNN-based detection of welding crack defects in Radiographic Non-Destructive Testing..

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In the industrial sector, the focus in recent years has been on enhancing production and minimizing human error. Therefore, engineers have used non-destructive testing to evaluate materials by combining AI technologies with non-destructive tests. One of the field applications of NDT is the detection of welding defects. Therefore, the use of neural networks enhanced the accuracy of detecting defects in industrial welding radiation testing. CNN with a triple classification for welding defects was suggested. Cut the original images to 150 × 150 pixels in the first step. The images were then divided into three categories: training, testing, and validation.

In the triple classification experiment (Crack, other types of Defects, No Defects), the CNN model had 6 layers and 9,667 parameters. Model accuracy approached 0.92% after 800 epochs. The F1 factors of Crack, other types of Defects, and No Defects were 100%, 91%, and 90%, respectively.

The article provides methods used by CNN in detecting welding defects and highlights the potential to improve defect detection accuracy.

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