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Defect Detection for Nanofibrous Images with Deep Learning-Based Approaches

Authors : Gaokai Liu

Abstract : Automatic defect detection for nanomaterial images is widely required in industrial scenarios. Deep learning approaches are considered as the most effective solutions for the great majority of image-based tasks. In this paper, an edge guidance network for defect segmentation is proposed. First, the encoder path with multiple convolution and downsampling operations is applied to the acquisition of shared features. Then two decoder paths both are connected to the last convolution layer of the encoder and supervised by the edge and segmentation labels, respectively, to guide the whole training process. Meanwhile, the edge and encoder outputs from the same stage are concatenated to the segmentation corresponding part to further tune the segmentation result. Finally, the effectiveness of the proposed method is verified via the experiments on open nanofibrous datasets.

Keywords : deep learning, defect detection, image segmentation, nanomaterials
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