Using Computer Vision to Detect and Localize Fractures in Wrist X-ray Images

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Abstract : The most frequent type of fracture is a wrist fracture, which often makes it difficult for medical professionals to find and locate. In this study, fractures in wrist x-ray pictures were located and identified using deep learning and computer vision. The researchers used image filtering, masking, morphological operations, and data augmentation for the image preprocessing and trained the RetinaNet and Faster R-CNN models with ResNet50 backbones and Adam optimizers separately for each image filtering technique and projection. The RetinaNet model with Anisotropic Diffusion Smoothing filter trained with 50 epochs has obtained the greatest accuracy of 99.14%, precision of 100%, sensitivity/recall of 98.41%, specificity of 100%, and an IoU score of 56.44% for the Posteroanterior projection utilizing augmented data. For the Lateral projection using augmented data, the RetinaNet model with an Anisotropic Diffusion filter trained with 50 epochs has produced the highest accuracy of 98.40%, precision of 98.36%, sensitivity/recall of 98.36%, specificity of 98.43%, and an IoU score of 58.69%. When comparing the test results of the different individual projections, models, and image filtering techniques, the Anisotropic Diffusion filter trained with 50 epochs has produced the best classification and regression scores for both projections.

Keywords : Artificial Intelligence, Computer Vision, Wrist Fracture, Deep Learning
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