

Detecting pelvic fracture on 3D-CT using deep convolutional neural network

~Diagnosis on 3D images using multi-oriented slab images~

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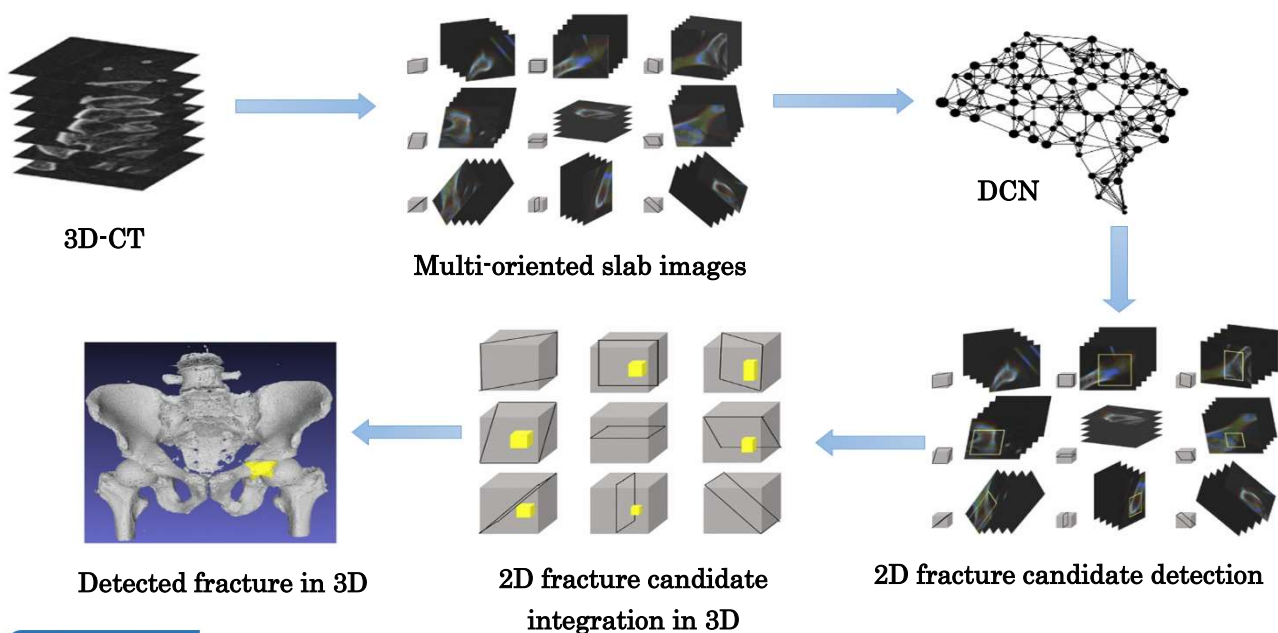
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Keyword

Pelvic fracture, 3D-CT, multi-oriented slab images, DCNN, YOLOv3

Abstract

Pelvic fracture is one of the leading causes of death in the elderly. The mortality rate is even higher within one year of fracture. This study proposes an automatic method to detect pelvic fracture on 3D-CT images. At first, 3D-CT images are rotated in 9 directions to generate multi-oriented slab images. Later, multiple deep convolutional neural networks(DCNN) named YOLOv3 are trained using the multi-oriented slab images to obtain 2D fracture candidates. Later, the fractures in 3D are obtained by integrating the 2D feature candidates. The final DCNN can detect pelvic fractures and visualize them in 3D.



Appeal point

The number of pelvic fractures is rising. However, the number of radiologists and doctors specializing in pelvic fracture is not increasing. Moreover, inspecting CT images for fractures takes a long time. A quick diagnosis of pelvic fracture is necessary, especially in the emergency room. Our proposed method can assist doctors and radiologists to find pelvic fractures quickly. In addition, our proposed method considers pelvic fractures from different viewing angles to efficiently find the fracture area in 3D. This work has already been published in Scientific Reports (DOI: 10.1038/s41598-021-91144-z).