

## 3D Vision Transformer for Cervical Spine Fracture Detection and Classification

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**Abstract :** In the United States alone, there are over 1.5 million spine fractures per year, resulting in about 17,730 spinal cord injuries. The cervical spine is where fractures in the spine most frequently occur. The prevalence of spinal fractures in the elderly has increased, and in this population, fractures may be harder to see on imaging because of coexisting degenerative illness and osteoporosis. Nowadays, computed tomography (CT) is almost completely used instead of radiography for the imaging diagnosis of adult spine fractures (x-rays). To stop neurologic degeneration and paralysis following trauma, it is vital to trace any vertebral fractures at the earliest. Many approaches have been proposed for the classification of the cervical spine [2d models]. We are here in this paper trying to break the bounds and use the vision transformers, a State-Of-The-Art- Model in image classification, by making minimal changes possible to the architecture of ViT and making it 3D-enabled architecture and this is evaluated using a weighted multi-label logarithmic loss. We have taken this problem statement from a previously held Kaggle competition, i.e., RSNA 2022 Cervical Spine Fracture Detection.

**Keywords :** cervical spine, spinal fractures, osteoporosis, computed tomography, 2d-models, ViT, multi-label logarithmic loss, Kaggle, public score, private score

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