Deep Learning Based Cervical Spine Bones Detection: A case study using YOLO

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***Abstract*— Cervical spine bones detection plays a crucial role in various medical applications, such as diagnosis, surgical planning, and treatment assessment. Traditional methods for cervical spine bones detection often rely on manual identification and segmentation, which are time-consuming and prone to errors. In recent years, deep learning approaches have shown great potential in automating the detection process and achieving high accuracy. In this research paper, we propose a deep learning-based approach for detecting cervical spine bones. Our suggested approach employs the YOLOv5 architecture, a cutting-edge object identification system renowned for its effectiveness and precision. The model is trained to recognize and locate bones structures using computed tomography (CT) scans image of the cervical spine as inputs. We conduct extensive evaluations using the trained models on the cervical spine dataset. The mean average precision (mAP) scores achieved by our model are 93% at threshold (mAP_0.5) and 83% at thresholds ranging from (mAP_0.5:0.95), which demonstrate the effectiveness of our approach in accurately detecting and localizing cervical spine bones. Our deep learning-based method for detecting cervical spine bones with high mAP scores presented in this research paper has significant implications for medical applications. With accurate and reliable bones detection, medical professionals can enhance diagnosis, surgical planning, and treatment assessment processes. The achieved mAP scores showcase the performance and potential of our proposed method, contributing to the advancement of bone detection techniques in cervical spine imaging and facilitating collaboration between the medical imaging and deep learning communities.**

***Keyword*—** Cervical Spine, Bones Detection, Computer Vision, Deep Learning, Computed Tomography (CT), YOLOv5

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