

DETEKSI ABNORMALITAS PARU-PARU DAN KLASIFIKASI JENIS PENYAKIT MENGGUNAKAN ALGORITMA *DEEP LEARNING YOLOv10* PADA CITRA *CHEST X-RAY*.

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ABSTRACT

Lung disease is a very complex and difficult to identify medical condition, based on WHO data in 2019, lung disease is the 3rd leading cause of death in the world with a death toll reaching 3.23 million people. In this case, detection of lung abnormalities is a crucial component in the early diagnosis of lung disease and treatment of respiratory diseases, such as pneumonia, tuberculosis, and pulmonary fibrosis. In this study, researchers implemented the YOLOv10 algorithm, a deep learning model based on object detection to analyze chest radiography (Chest X-Ray/CXR) images with high precision and real-time speed. This model is able to identify and classify various types of lung diseases through the resulting bounding box, thus overcoming the main challenges in medical diagnosis, such as time constraints and accuracy. This study uses the VinBigData dataset consisting of lung X-ray images, with a transfer learning approach to improve model performance. The Weighted Boxes Fusion (WBF) technique is applied to optimize predictions by combining several bounding boxes, thereby increasing the stability and accuracy of detection. Experimental results show that YOLOv10 achieves a mean Average Precision (mAP@0.5) of 83% and a recall of 91%, confirming its superiority in efficiency and accuracy compared to conventional methods. To improve accessibility, the system is integrated into a prototype web-based and mobile application, allowing medical personnel and patients to access the analysis results flexibly and in real time. Thus, this technology not only offers an innovative solution in the diagnosis of lung diseases but also has the potential to revolutionize healthcare, especially in areas with limited medical resources.

Keyword: Lung Abnormality Detection, Deep Learning YOLOv10, Medical X-ray Imaging